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Improvement of gross motor skills in children with hearing loss: through a game model reviewed from the aspect of independence

Mejora de la motricidad gruesa en niños con hipoacusia: a través de un modelo de juego revisado desde el aspecto de la independencia

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Abstract. This study aims to find out: (1) The difference in the influence of the water game model and the dingklik relay game on the improvement of gross motor skills in deaf children. (2) The difference in the effect between high and low independence on the improvement of gross motor skills in deaf children. (3) The interaction between the water game model and the dingklik relay game was reviewed from the aspect of independence to improve gross motor skills in deaf children. This type of research is an experiment using a 2 x 2 factorial design. The population in this study is 38 deaf children of SLB N Mesuji Lampung. The sample in this study amounted to 20 deaf children who were taken using the purposive sampling technique, then ordinal pairing was carried out to divide each group. The instrument used was to measure independence using the questionnaire method, while gross motor used (1) a test of walking on a straight line of 5 meters, (2) a test of running avoiding five obstacles as far as 15 meters, (3) a test of standing on one foot for 10 seconds, (4) a test of jumping from a 15 cm high block, (5) a test of jumping from a 15 cm high beam. The data analysis technique used is ANOVA two-way. The results showed that: (1) There was a difference in the influence of the water game model and the dingklik relay game on the improvement of gross motor skills in deaf children, with a value of F 8.667 and a significance value of p 0.010 < 0.05. The water competition group was higher (good) compared to the dingklik relay game group with an average posttest difference of 1.3. (2) There is a difference in the influence between high and low independence on the improvement of gross motor ability in deaf children, it is proven that the F value is 22.615 and the significance value p is 0.000 < 0.05. Children who have high independence are higher (good) compared to children who have low independence, with an average posttest difference of 2.1. (3) There was an interaction between the water game model and the dingklik relay game from the aspect of independence (high and low) on the improvement of gross motor skills in deaf children, with a value of F 70.205 and a significance value of p 0.000 < 0.05.
Keywords: water games, dingklik relay games, independence, gross motor.

Resumen. Este estudio tiene como objetivo averiguar: (1) La diferencia en la influencia del modelo de juego de agua y el juego de relevos dingklik en la mejora de la motricidad gruesa en niños sordos. (2) La diferencia en el efecto entre alta y baja independencia en la mejora de las habilidades motoras gruesas en niños sordos. (3) Se revisó la interacción entre el modelo de juego de agua y el juego de relevos dingklik desde el punto de vista de la independencia para mejorar la motricidad gruesa en niños sordos. Este tipo de investigación es un experimento que utiliza un diseño factorial 2 x 2. La población de este estudio es de 38 niños sordos de SLB N Mesuji Lampung. La muestra en este estudio fue de 20 niños sordos que fueron tomados mediante la técnica de muestreo intencional, luego se realizó un emparejamiento ordinal para dividir cada grupo. El instrumento utilizado fue medir la independencia mediante el método del cuestionario, mientras que la motricidad gruesa utilizó (1) una prueba de caminar en línea recta de 5 metros, (2) una prueba de correr evitando cinco obstáculos hasta 15 metros, (3) una prueba de pararse sobre un pie durante 10 segundos, (4) una prueba de saltar desde un bloque de 15 cm de altura, (5) una prueba de saltar desde una viga de 15 cm de altura. La técnica de análisis de datos utilizada es ANOVA de dos vías. Los resultados mostraron que: (1) Hubo diferencia en la influencia del modelo de juego de agua y el juego de relevos dingklik en la mejora de la motricidad gruesa en niños sordos, con un valor de F 8,667 y un valor de significancia de p 0,010 < 0,05. El grupo de competición acuática fue más alto (bueno) en comparación con el grupo de juego de relevos dingklik, con una diferencia media postest de 1,3. (2) Existe una diferencia en la influencia entre alta y baja independencia en la mejora de la motricidad gruesa en niños sordos, se comprueba que el valor de F es de 22,615 y el valor de significación p es de 0,000 < 0,05. Los niños que tienen una alta independencia son más altos (buenos) en comparación con los niños que tienen una baja independencia, con una diferencia promedio postest de 2.1. (3) Hubo una interacción entre el modelo de juego de agua y el juego de relevos dingklik desde el aspecto de la independencia (alta y baja) en la mejora de la motricidad gruesa en niños sordos, con un valor de F 70,205 y un valor de significancia de p 0,000 < 0,05.
Palabras clave: juegos acuáticos, juegos de relevos dingklik, independencia, motricidad gruesa.

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Introduction

In developing and improving the quality of human resources, education services play an important role. In educational institutions, the factor that determines the success of educational goals is teachers (Saloviita, 2020; Tang, 2020). The role of teachers in the innovation and development of learning models is very necessary considering that teachers can be said to be players who play a very important role in the teaching and learning process in the classroom and should be

able to cultivate their abilities to create effective and efficient learning models.

A good learning model that is by the student's condition will provide comfort for teachers, students, and everyone in the learning environment. The learning strategies or methods that are selected and developed must be by the abilities and goals to be achieved, the characteristics of the students, and their chronological age (Yulianti & Sulistiyawati, 2020). A good learning model can not only be implemented in ordinary schools or regular schools.

Extraordinary Schools (SLB) also have their learning models and methods for their students. The learning model is the main foundation of school success, especially for students (Leithwood et al., 2020; Ramadhani et al., 2019). Extraordinary Schools (SLB) are schools that contain special children or extraordinary children who of course have differences with normal children in general (Asrofin & Efi Kristiana, 2023; Etana et al., 2020). Children in extraordinary schools cannot be equated with normal children in general, who have to learn on their own. These extraordinary children need the right learning methods and are in line with the targets.

Learning in the classroom will be effective when teachers and students can work well together, and teachers can choose the right learning model for students (Capella-Peris et al., 2020; Rifqi Festiawan et al., 2024; Ketut Yoda et al., 2024). Students will easily and without being forced to follow learning in the classroom when teachers can attract students' attention and use learning models that are preferred by students (Pranoto et al., 2024). This learning model will not be separated from the existence of learning media that can help in teaching. When media and learning tools are available properly, they can help the learning process effectively (Julianti et al., 2024; Risnawati et al., 2024).

Of the various types of children with special needs, deafness is one type of child limitation that also needs to be considered. (Hall et al., 2019; Howerton-Fox & Falk, 2019) Stating that deafness can be interpreted as the condition of an individual who has damage to the sense of hearing so that it cannot capture various sound stimuli, or other stimuli through hearing. In general, every activity of human life is inseparable from movement. Humans carry out movement activities, be it gross movement (gross motor) or fine movement (fine motor) according to the student's ability. The most ideal basic movement learning occurs in the children's phase. Having good gross motor skills for children with special needs is very important to support the child's movement in making movements into a coordinated, controlled, and orderly response. Gross motor skills in children need to be trained because, at an early age, this motor ability is the beginning of the development of other abilities, such as sensory skills and thinking skills (Apriantono et al., 2024; R Festiawan, 2021; Ngadiman et al., 2021; Susanto et al., 2023).

Based on the results of observations and initial interviews with 10 teachers at SLB N Mesuji conducted on March 22, 2024, it was revealed that the average gross motor ability of deaf children is still low. This is because the learning model used by these teachers is a classical learning model, so the results are still less effective in improving the gross motor skills of deaf children. The material provided by the health education teacher is still in the form of techniques such as jumping and jumping well, throwing and catching the ball, and maintaining balance when climbing the walkway, not yet in the form of fun play. Related to the reality that occurs on the field and monotonous play activities, there is a new play activity that is more fun for children. And these play activities are very rare for children to find.

Based on observations, the motor skills of children with special needs are also still not optimal, with students tending to move at will not paying attention, and not following the movements instructed by the teacher, so 30 students do not meet the KKM score. The standard value of KKM in schools is extraordinary at 80. Teachers in exceptional schools have difficulty finding references that can help find the right game modifications and learning models for teaching, and the lack of teaching facilities and infrastructure is a consideration for teachers who cannot make modifications and variations in teaching.

Results of previous research conducted by (Humphries et al., 2019) state that in fact, the characteristics of deaf children in the process of movement of students prefer to be silent, closed, lazy to move, and tend to be passive when doing group games. This is due to the lack of hearing that exists in him, causing the games given to him to not vary because not all games for normal children can be given directly to deaf children. If this continues to be left unchecked, it will certainly be very bad for the development of movement and also gross motor for the future.

Efforts to guide deaf children towards healthy psychological adjustment will depend heavily on fun interactions, for example using a learning model with games (Freitas et al., 2022). Good awareness and understanding of deaf children will be very helpful in developing the social attitudes and independence of deaf children (Haris et al., 2024; Nusri et al., 2024; Pitnawati et al., 2023; Umar et al., 2023). (Muhoozi et al., 2018) states that the maturity of a child requires different treatment as the age of maturity develops. Independence is concerned with tasks and skills on how to do something, how to achieve something, and how to manage something (Meylia et al., 2020). After students graduate from school, students have the independence to do things on their initiative and the ability to self-organize, according to their rights and obligations so that they can solve the problems they face without asking to depend on others and can be responsible for themselves.

Therefore, deaf children through education in extraordinary schools need a learning model that can form confidence

and lead students as human beings in general and be able to make students independent in life in society. Independence for children will provide hope for families and society and this will be realized if appropriate educational services are provided. One of the learning models that can form an attitude of independence for deaf children is the game-based learning model (Boushey & Moser, 2023).

In physical education learning, a game can be played that can increase learning goals to be achieved (Ribas et al., 2023; Sgro et al., 2019). From the process of analyzing several previous research results, to improve learning outcomes and to improve the skills of deaf children, a game-based learning model is needed. Considering the importance of motor activities to train the motor skills of deaf children (Veiskarami & Roozbahani, 2020). Opinion of (Suherman et al., 2019) said that improving children's motor skills can be done with a game-based motor learning development strategy.

Forms of play that can improve gross motor skills must include activities such as running, walking, or jumping that require large muscles (Oskar & Caflisch, 2019). Games are one of the means to improve children's gross motor skills. A game is a tool used by children to explore and find new information that children do not find without a game (Trajkovik et al., 2018).

One of the games that can improve children's gross motor skills is to play aquatic/water. The aquatic material contains activities carried out in the swimming pool, such as; water games, swimming styles, safety in the water, and the development of relevant aspects of knowledge and the values contained in it (Juan et al., 2022). In addition, providing learning with innovative, interesting, and fun methods also affects students' understanding of the learning material (Aljawarneh, 2020).

Growth and development stimulation in children aged 5-6 years is carried out through games that provide opportunities for children to move freely. The concept of basic movement-based learning development in water games is to use water as one of the tools in the game process (Arhesa & Badriah, 2021). Water is used as a good medium in stimulating children's development in building confidence, motor skills, hand-eye coordination, and improving fitness.

The water game model to improve the gross motor skills of deaf children is expected to be a teaching material for teachers in the learning process. The water game model for physical education learning has been adapted to the development stage of deaf children in elementary school is extraordinary. This model was created to train the motor skills of deaf children. One of the other game activities that can be done to improve physical and motor skills is the dingklik relay game. Previous research conducted by (Wijayanti, 2018) shows that there is an influence of playing with the dingklik relay on children's motor skills. By playing relay games, children will indirectly develop abilities including running, coordination, agility, and cooperation.

Play activities are closely related to children's gross motor skills. Children's bones and muscles are getting stronger and children's lung capacity is getting bigger so that students can do gross motor activities better and faster (Case & Yun, 2019). Menurut (Kogoya et al., 2023; Setiawan et al., 2024; Sumartiningsih et al., 2022; Yanti & Wirman, 2023) Those who researched relay play said that by playing relays, children will indirectly develop abilities including running, coordination, agility, and cooperation.

Based on the description of the problem above, the researcher aims to analyze the influence of the game model with the aspect of independence on the gross motor ability of deaf children. So that researchers can contribute and the best solution to improve the gross motor skills of deaf children, and the data can be used for further learning for extraordinary schools.

Materials and Methods

Research Design

This type of research is an experiment with a 2 x 2 factorial design design. This experimental study used two different treatment groups, namely the provision of water game models and dingklik relay games on the gross motor skills of deaf children.

Research Procedure

The data collection method in this study is test and measurement. Before the pretest and posttest measurements are carried out, the sample is first measured for independence, to determine high and low independence. To measure independence in this study, use the questionnaire method. The scale used in this study is the Likert scale. To find out the gross motor skills of deaf children, tests were carried out consisting of (1) a test of walking on a straight line of 5 meters, (2) a test of running to avoid five obstacles as far as 15 meters, (3) a test of standing on one foot for 10 seconds, (4) a test of jumping from a 15 cm high block, (5) a test of jumping from a 15 cm high block. The research process was carried out for 16 meetings, where in one week 3 meetings were held. And ending with taking a final test or post-test to measure the gross motor ability of deaf children to recognize the comparison of gross motor ability scores of deaf children after treatment.

Research Participants

The population in this study is all deaf children of SLB N Mesuji, Lampung Province, totaling 38 children. In this study, inclusion criteria are applied to determine the sample of this study, which is based on certain criteria desired by the researcher, including specific deaf children, children who are

actively attending school, children who are not sick, willing to follow the learning process, able to participate in all learning model programs that have been prepared, children who are 5-6 years old. Meanwhile, the exclusion criteria in this study are things that cause the sample not to meet the criteria to be used as a sample, such as sick children. The sample grouping was taken from children with high independence as much as 27% and children with low independence as much as 27% from the data that had been ranked. Based on this, a sample of 10 children with high independence and 10 children with low independence was obtained, so a total sample of 20 children was obtained. This research has received approval from all samples that have filled out a statement of ability to be a research sample and have met the requirements of the research code of ethics.

Data Analysis

The data analysis method used in this research uses SPSS version 24, namely by using ANOVA two-way at a significance level = 0.05. Next, to compare the average companions of the treatment used the Tukey test (Santoso, 2018). Before arriving at the use of ANOVA 2-way (ANOVA two-way), it is necessary to try the prerequisite tests, which include: (1) normality test and (2) variant homogeneity test and hypothesis test.

Results and Discussion

The chapters on research results and discussions will be presented in order, including (1) research result data, (2) analysis prerequisite test, and (3) hypothesis test. The hypothesis tests in this study will be presented in order, including (a) the difference in the influence between the water game model and the dingklik relay on the improvement of gross motor skills of deaf children; (b) the difference in the influence of children who have high and low independence on the improvement of gross motor skills in deaf children; and (c) the interaction between the water game model and the dingklik relay and independence on the improvement of gross motor skills of deaf children. In full it will be presented as follows:

Information:

A_1B_1: The group of deaf children who were trained used a water game model with high independence.

A_2B_1: A group of deaf children who are trained using a dingklik relay game model with high independence.

A_1B_2: A group of deaf children were trained using a water game model with low independence.

A_2B_2: The group of deaf children who were trained using the dingklik relay game model had low independence.

Based on Figure 1 above, shows that the gross motor skills of deaf children in the A_1B_1 group have an average pretest of 11.4 and have increased at the time of the posttest 14.2, the A_2B_1 group has an average pretest of 7.6 and increased at the time of the posttest by 9.2, the A_1B_2 group has an average pretest of 6.8 and has an increase at the time of the posttest of 8.4, the A_2B_2 group has an average prestest of 8.2 and has an increase at the time of the posttest of 10.6.

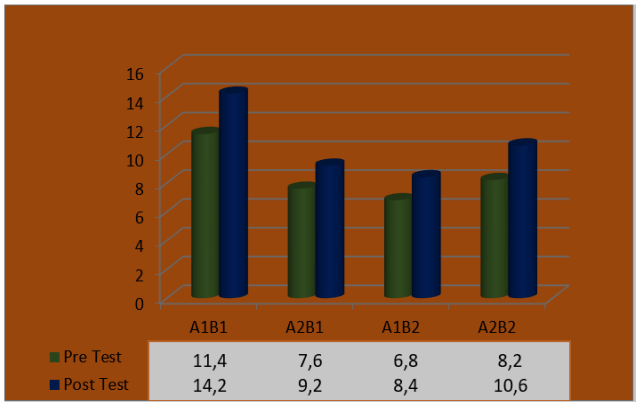

Figure 1. Trunk Diagram of Pretest and Posttest Gross Motor for Deaf Children

Prerequisite Test Results

a. Normality Test

The data normality test in this study was carried out using the Shapiro-Wilk method. The results of the data normality test carried out in each analysis group were carried out with the SPSS software program version 20.0 for Windows with a significance level of 5% or 0.05. A summary is presented in Table 1 as follows:

Table 1.
Summary of Normality Test Results

Group	P	Significance	Information
Pretest A_1B_1	0.201	0,05	Usual
Posttest A_1B_1	0.314		Usual
Pretest A_2B_1	0.814		Usual
Posttest A_2B_1	0.314		Usual
Pretest A_1B_2	0.314		Usual
Posttest A_1B_2	0.201		Usual
Pretest A_2B_2	0.314		Usual
Posttest A_2B_2	0.314		Usual

Based on the statistical analysis of the normality test that has been carried out using the Shapiro-Wilk test, on all pretest and post-test data of gross motor of deaf children, the results of the normality test of the significance value of $p > 0.05$, which means that the data is normally distributed.

b. Homogeneity Test

The homogeneity test was carried out to test the equation of several samples, namely homogeneous or not. The homogeneity test is intended to test the similarity of variants between pretest and posttest. The homogeneity test in this study is the Levene Test. The results of the homogeneity test are presented in Table 2 as a form of.

Table 2.
Summary of Homogeneity Test Results

F	df1	df2	*Sig.*
1,447	3	16	0,266

Based on statistical analysis of homogeneity tests that have been carried out using the Levene Test. The results of the calculation obtained a significance value of 0.266 ≥ 0.05. This means that the data group has homogeneous variants. Thus the population has the same variant or homogeny.

Hypothesis Test Results

The test of the research hypothesis was carried out based on the results of data analysis and interpretation of ANOVA two-way analysis. The order of the results of hypothesis testing is adjusted to the formulated hypothesis, as follows.

a. Hypothesis of the difference in the influence between the water game model and the dingklik relay on the improvement of gross motor ability

The first hypothesis reads "There is a significant difference in the influence between the water game model and the dingklik relay on the improvement of gross motor skills of deaf children". Based on the results of the analysis, the data in Table 3 is obtained as follows.

Table 3.
The results of the ANOVA Test between the Water Game Model and the Relay were clicked on the improvement of gross motor skills of Deaf children.

Source	Type III Sum of squares	Df	Mean Square	*F*	*Sig.*
Game Models	8,450	1	8,450	8,667	0,010

From the results of the ANOVA test in Table 3 above, it can be seen that the significance value of p is 0.010 and the value of F is 8.667. Since the significance value of p is 0.010 < 0.05, it means that H0 is rejected. Thus there is a significant difference in influence. Based on the results of the analysis, it turned out that the water game model group was 11.30 higher (good) compared to the dingklik relay group of 10.00 with an average posttest difference of 1.3. This means that the research hypothesis that "There is a significant difference in influence between water game model training and dingklik relay on the improvement of gross motor skills of deaf children" has been proven.

b. Hypothesis of the difference in the influence between children who have high and low independence on the improvement of gross motor skills of deaf children

The second hypothesis reads "There is a significant difference in influence between children who have high and low independence on the improvement of gross motor skills of deaf children". The results of the calculation are presented in Table 4 as follows.

Table 4.
ANOVA Test Results Differences between Children with High and Low Independence to Improve Gross Motor Ability of Deaf Children.

Source	Type III Sum of squares	Df	Mean Square	*F*	*Sig.*
Child Independence	22,050	1	22,050	22,615	0,000

From the results of the ANOVA test in Table 4 above, it can be seen that the significance value of p is 0.000 and the value of F is 22.615. Since the significance value of p is 0.000 < 0.05, it means that H0 is rejected. Based on this, it means that there is a significant difference in influence. Based on the results of the analysis, it turned out that children who had high independence of 11.70 were higher (good) compared to children who had low independence of 9.6, with an average difference of 2.1 posttest. This means that the research hypothesis that states that "There is a significant difference in influence between children with high and low independence on the improvement of motor skills of deaf children", has been proven.

c. Interaction between water game model and dingklik esftafet and independence (high and low) on improving gross motor skills of deaf children

The third hypothesis reads "There is a significant interaction between the game model (Water Game and Dingklik Relay) and independence (high and low) on the improvement of gross motor skills of deaf children". The results of the calculation are presented in Table 5 as follows:

Table 5.
ANOVA Test Results Interaction between Game Models (Water Games and Dingklik Relay) and Independence (High and Low) on Improving Gross Motor Ability of Deaf Children

Source	Type III Sum of squares	Df	Mean Square	*F*	*Sig.*
Game Models and Children's Independence	68,450	1	68,450	70,205	0,000

From the results of the ANOVA test in Table 5 above, it can be seen that the significance value of p is 0.000 and the F value is 70.205. Since the significance value of p is 0.000 < 0.05, it means that Ho is rejected. Based on this, the hypothesis that states "There is a significant interaction between the game model (water games and dingklik relays) and children's independence (high and low) to the improvement of gross motor skills of deaf children", has been proven.

After being tested that there is an interaction between the game model (water games and dingklik relay) and independence (high and low) on the improvement of gross motor skills of deaf children, it is necessary to carry out further tests using the Tukey test. Further test results can be seen in Table 6 below:

Table 6.
Post Hoc Test Summary

Group	Interaction	Mean Difference	Std.Error	Sig.
Water Play Group - High Independence	Water Play Group-Low Independence	5,2000*	0,67864	0,000
	Dingklik Relay Game Group-High Independence	4,4000*	0,67864	0,000
	Dingklik Relay Game Group-Low Independence	3,2000*	0,67864	0,000
Water Play Group-Low Independence	Water Play Group-High Independence	-5,2000*	0,67864	0,000
	Dingklik Relay Game Group-High Independence	-0,8000	0,67864	0,644
	Dingklik Relay Game Group-Low Independence	-1,9000*	0,67864	0,039
Dingklik Relay Game Group-High Independence	Water Play Group-High Independence	-4,4000*	0,67864	0,000
	Water Play Group-Low Independence	0,8000	0,67864	0,644
	Water Play Group-Low Independence	-11,000	0,67864	0,380
	Water Play Group-High Independence	-3,3000*	0,67864	0,000
Dingklik Relay Game Group-Low Independence	Water Play Group-Low Independence	1,9000*	0,67864	0,039
	Dingklik Relay Game Group-High Independence	1, 1000	0,67864	0,380

Based on Table 6, the results of the calculation of the Tukey test on the asterisk sign (*) show that the pairs that have significantly different interactions or pairs are: (1) A_1B_2, A_2B_1, A_2B_2, (2) A_1B_1, A_2B_2, (3) A_1B_1, (4) A_1B_1, A_1B_2, while the other pairs are stated to have no difference in influence are: (2) A_2B_1 (3) A_1B_2, A_1B_2. (4) A_2B_1.

Discussion

The discussion of the results of this study provides a further interpretation of the results of the data analysis that has been presented. Based on hypothesis testing, three groups of analysis conclusions were produced, namely: (1) there was a significant difference in influence between the main factors of the study; (2) The difference in the influence between children who have high and low independence on the improvement of gross motor skills of deaf children; (3) there is a meaningful interaction between the main factors in the form of two-factor interactions. The discussion of the results of the analysis can be further explained as follows.

Difference in the effect between the water game model and the dingklik relay on the improvement of gross motor skills of deaf children

Based on hypothesis testing, it is known that there is a significant difference in the influence between the water game model and the dingklik relay on the improvement of gross motor skills of deaf children. The water play model group was higher (good) compared to the dingklik relay group on the improvement of gross motor skills of deaf children. This is supported by previous research conducted by (Akinola et al., 2019) stated that aquatic activities can develop gross motor skills in children with special needs. Other research data conducted by (Battaglia et al., 2019) revealed that there was a significant influence of aquatic activity programs on the gross motor skills of autistic children. Aquatic activities affect children's gross motor skills because, in the process of implementing aquatic activities, there are basic elements of motor ability components. Results (Cook et al., 2019) prove that the water exercise program is effective in improving gross motor skills in children with special needs.

Results (Tyas & Phytanza, 2019) prove that the water program can increase muscle strength in autistic children. According to (Siega et al., 2021) Aquatic activities are activities carried out in the water that aim to train children to obtain progress in gross motor, cognition, affection, and social potential. Aquatic activities or water media can provide a unique and fun atmosphere for all children who experience limitations, one of which is deaf. The purpose of water games is to bring out their courage in carrying out activities in the water, provide enrichment of movement for them, especially their gross motor skills, and be able to reduce psychological, physical, and social disorders or deviations.

The water game model to improve the gross motor skills of deaf children is expected to be a teaching material for teachers in the learning process. The water game model for physical education learning has been adapted to the development stage of deaf children in elementary school is extraordinary.

The difference in the influence between children with high and low independence on the improvement of gross motor skills of deaf children

The results of the analysis showed that there was a significant difference in the influence between children who had high and low independence on the improvement of gross motor skills in deaf children. Children who have high independence are higher (good) compared to children who have low independence to improve the gross motor skills of deaf children. One of the factors that affect children's gross motor skills is independence (MAHMUD, 2019). This is in line with the results of previous research conducted by (Wijaya et al., 2024) which states that bringing children who have high independence is better than children who have low independence to improve children's motor skills. Independence is the ability or skill that children have to do everything on their own, both related to self-help activities and activities in their daily lives without depending on others (Boushey & Moser, 2023). Growing independence in individuals from an early age is very

important because by having independence from an early age, children will get used to doing their own needs or activities.

Interaction between game models (water games and dingklik relays) and independence (high and low) on the improvement of gross motor skills of deaf children

Based on the results that have been presented in the results of this study, there is a significant interaction between the game model (water games and dingklik relays) and independence (high and low) on the improvement of gross motor skills of deaf children. The results showed that the water play model was a more effective model for children who had high independence and the dingklik relay game model was more effective for children with low independence. In water activities, there is buoyancy which can work as an aid to reduce the burden on the body or can also be a prisoner (Barbosa et al., 2019). Buoyancy can work as a resistance if the movement that occurs in the water is a movement that presses down or into the water, this resistance can be used as muscle strengthening. Activities carried out against gravity can strengthen and support muscles and connective tissue because muscles can form forces to move or withstand weight. From the results of the interaction, it appears that the main factors of the study in the form of two factors show significant interactions. In the results of this study, the interaction means that each cell or group has a different influence on each group that is paired.

Conclusion

Based on the results of the research and the results of the data analysis that has been carried out, the following conclusions are obtained: 1) There is a significant difference in the influence between the water game model and the dingklik relay on the improvement of gross motor skills of deaf children. The water play model group was higher (good) compared to the dingklik relay training group on the improvement of gross motor skills of deaf children. 2) There is a significant difference in influence between children who have high and low independence on the improvement of gross motor skills of deaf children. Children who have high independence are higher (good) compared to children who have low independence to improve the gross motor skills of deaf children. 3) There was a significant interaction between the play model (water games and dingklik relays) and independence (high and low) on the improvement of the gross motor skills of deaf children. The results showed that the water game model was a more effective method to use for children with high independence and the dingklik relay game model was more effective to use for children with low independence.

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Conflicts of interest

We know there is no conflict of interest associated with this publication, and there has not been significant financial support for this work that could affect the outcome. As a suitable author, I confirm that the manuscript has been read and approved for submission by all the authors mentioned.

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