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The Effect of Playing Bekel Ball on Hand Motor Skills of Children With Physical Disabilities at SLB A,B,D Negeri Kedungkandang, Malang City

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Abstract

Hand motor skills are a crucial aspect for children with physical disabilities, as they relate to the ability to perform daily activities requiring coordination, precision, and movement control. This study aimed to examine the initial state of hand motor skills, the skills following intervention, and the impact of the bola bekel game on the hand motor skills of a child with a physical disability at SLB A,B,D Negeri Kedungkandang, Malang City. The study employed a quantitative experimental approach using the Single-Subject Research (SSR) method and an A-B-A design, comprising baseline-1, intervention, and baseline-2 phases. The subject was a child with a physical disability at the Special Elementary School (SDLB) level who experienced difficulties in grasping, throwing, catching, and picking up objects, yet remained capable of following simple instructions. Data were collected through structured observation, experimental tests, and documentation. The intervention involved structured *bola bekel* game sessions that combined instruction, demonstration, repetitive practice, and reinforcement. Data analysis utilized quantitative descriptive statistics by comparing changes in motor skills across the various research phases. The results indicate a change in hand motor skills following the *bola bekel* game intervention.

Keywords: Playing bekel ball; Hand motor skills; Children with physical disabilities.

1. Introduction

Children with physical disabilities, commonly referred to as tunadaksa, are learners who experience impairment in the function of their motor organs as a result of structural abnormalities, muscle weakness, or nervous system disorders (Astati, 2012). Such impairments generally do not only limit the child's mobility but also affect fine motor skills, particularly hand coordination in grasping, throwing, catching, and picking up objects. Hallahan and Kauffman (2017) emphasize that although the intellectual potential of children with physical disabilities generally falls within the normal range, limitations in physical activity and coordination still require an adaptive learning approach, including the use of play-based media as a means of motor stimulation.

Hand motor skill is part of fine motor skills that involve the cooperation of small muscles in the fingers and wrist. This skill serves as an important foundation for children to carry out daily activities as well as academic tasks such as writing and manipulating stationery (Haywood & Getchell, 2019). In children with physical disabilities, limited range of motion, joint stiffness,

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and weak grip strength are often the main obstacles in mastering such skills, so structured yet enjoyable forms of training are needed so that children do not feel burdened.

One alternative medium that can be used to train hand motor skills is the traditional bekel ball game. This game requires players to throw the ball, pick up the bekel seeds within a short period of time, and catch the ball again before it bounces twice, thereby naturally training eye-hand coordination, reflex speed, and concentration (Aini, Rahmawati, & Nugraha, 2022). Nurani and Fatoni (2022) further note that traditional games generally contain elements of movement and social interaction, making them an effective and enjoyable medium of motor stimulation for children, including children with special needs.

Research on the effect of bekel ball on fine motor skills has in fact been conducted several times, including by Qolbi, Astawa, Astini, and Nurhasanah (2023) on children aged 5-6 years at KB Pijar Beriman, which proved a significant effect of the bekel ball game on the fine motor skills of regular children, as well as Fitriani (2024), who found an increase in the mean score from 10.25 to 20.12 after children at RA Alauddin Makassar were given a similar intervention. Both studies reinforce the assumption that bekel ball can be used as a medium of motor stimulation; however, both remained focused on regular early-childhood learners and did not address the population of children with physical disabilities.

Based on observations made by the researcher during a Teaching Assistance program at SLB A,B,D Negeri Kedungkandang, a fourth-grade learner with a physical disability in the legs, requiring the use of a wheelchair, was found to also experience difficulty with hand coordination when playing bekel ball, particularly at the stage of catching the ball after it bounced. Building on the gap in previous research that had not specifically addressed children with physical disabilities, this study was designed to describe the initial condition of hand motor skills, the condition after being given the intervention, and the effect of playing bekel ball on the hand motor skills of a child with physical disabilities at SLB A,B,D Negeri Kedungkandang, Malang City.

2. Method

This study employed a quantitative experimental method with a single-subject research (SSR) approach. Sugiyono (2009:107) explains that experimental research is used to investigate the effect of a particular treatment on other variables under controlled conditions. Meanwhile, Kazdin (2011) states that SSR is an experimental design that uses repeated measurement to observe changes in individual behavior as a result of a given intervention.

The design employed was an A-B-A design, consisting of three phases: baseline-1 (A-1) as the measurement of the subject's initial condition prior to intervention, the intervention phase (B) involving structured and repeated treatment through playing bekel ball, and baseline-2 (A-2) as a repeated measurement after the intervention was withdrawn to determine whether the change in ability was maintained. Sunanto (2005:60) states that the A-B-A design is able to demonstrate a cause-and-effect relationship between the independent and dependent variables because it compares conditions within the same subject rather than between individuals or groups.

The research subject was determined purposively (Arikunto, 2010), namely one fourth-grade learner with the initial P, who had a mild-to-moderate physical disability affecting the ability to grasp, throw, catch, and pick up objects, yet was still able to follow simple instructions. The study was conducted at SLB A,B,D Negeri Kedungkandang, Malang City, with data collected over four sessions: one baseline-1 session (22 July 2026), two intervention sessions (23 and 27 July 2026), and one baseline-2 session (29 July 2026), each lasting 60 minutes.

Data were collected using a 1-4 scale observation sheet (Not Yet Developing, Beginning to Develop, Developing as Expected, Developing Very Well) consisting of 25 observation items covering four aspects: grasping, throwing, picking up, and catching. The score for each session was calculated by summing all item scores, comparing them with the maximum possible score, and multiplying by 100% to obtain a percentage value. Instrument validity was tested through content and construct validity using Aiken's V coefficient, which ranged from 0.667 to 1.000 (valid to very valid category), while instrument reliability was tested using Cronbach's Alpha coefficient, yielding $\alpha = 0.973$, categorized as highly reliable. The collected data were then analyzed descriptively through within-condition analysis and between-condition analysis, covering trend direction, level of stability, level change, and percentage of data overlap.

3. Results and Discussion

3.1 Result of the Baseline-1 (A-1) Condition

In the baseline-1 condition, the condition length was one session. The implementation of baseline-1 was intended to measure the subject's initial ability in grasping, throwing, picking up, and catching the bekel ball prior to any intervention. The subject was asked to play bekel ball independently while the researcher observed and scored the performance using the 25-item instrument that had been prepared. The data obtained in the baseline-1 condition are presented in Table 1.

Table 1. Baseline-1 (A-1) Data on Hand Motor Skills of a Child with Physical Disabilities

Session	Date	Score (%)
I	22 July 2026	66

Results of the Intervention (B) Condition

In the intervention condition, the condition length was two sessions. The subject was given treatment in the form of structured learning to play bekel ball, including demonstration, guided practice, and reinforcement at each stage of grasping, throwing, picking up, and catching. The researcher provided guidance whenever the subject experienced difficulty, particularly at the stage of catching the ball after it bounced on the floor. The data obtained in the intervention condition are presented in Table 2.

Table 2. Intervention (B) Data on Hand Motor Skills of a Child with Physical Disabilities

Session	Date	Score (%)
II	23 July 2026	84
III	27 July 2026	91

Results of the Baseline-2 (A-2) Condition

In the baseline-2 condition, the condition length was one session. The implementation of baseline-2 was a repetition of the initial condition intended to determine whether the improved hand motor skills observed during the intervention phase were maintained after the

treatment was withdrawn. The subject was again asked to play bekel ball independently without any additional guidance from the researcher. The data obtained in the baseline-2 condition are presented in Table 3.

Table 3. Baseline-2 (A-2) Data on Hand Motor Skills of a Child with Physical Disabilities

Session	Date	Score (%)
IV	29 July 2026	99

Overall, the subject's score increased consistently from 66% at baseline-1 to a mean of 87.5% during the intervention phase (84% and 91%), and reached 99% at baseline-2. Data were collected using a 1-4 scale assessment sheet for each item, then summed and compared with the maximum score multiplied by 100% to obtain the final percentage value. The value was then analyzed using visual within-condition and between-condition analysis, as is commonly applied in single-subject research.

Within-Condition Data Analysis

The results of the within-condition analysis are summarized in Table 4.

Table 4. Summary of Visual Analysis within Condition

Component	A-1	B	A-2
Condition length	1	2	1
Trend direction	(=)	(+)	(=)
Trend stability	Stable	Stable	Stable
Mean	66%	87.5%	99%
Level change	0	+7	0

Based on Table 4, the following summary was obtained: (1) the length of the baseline-1 (A-1) condition was one session, the length of the intervention (B) condition was two sessions, and the length of the baseline-2 (A-2) condition was one session; (2) the trend direction in condition B increased and was positive, whereas in A-1 and A-2 it was flat because each consisted of only a single data point; (3) the trend of stability across the three conditions was categorized as stable, with the percentage of data within range reaching 100%; (4) the level change in condition B was +7 points (from 84 to 91), indicating that the improvement in ability occurred gradually throughout the intervention.

Between-Condition Data Analysis

Table 5. Summary of Between-Condition Analysis

Component	B : A-1	A-2 : B
No. of variables changed	1	1
Change in direction	(=) to (+)	(+) to (=)
Change in stability	Stable-stable	Stable-stable
Level change	66→84 (+18)	91→99 (+8)
Percentage of overlap	0%	0%

Based on Table 5, the following summary was obtained: (1) the number of variables changed between the intervention (B) condition and baseline-1 (A-1) was one, as was the case

between baseline-2 (A-2) and the intervention (B); (2) the change in direction between A-1 and B was from flat to increasing and positive, whereas between B and A-2 it was from increasing to flat at a higher level; (3) the level change between A-1 and B was +18 points (from 66 to 84), while between B and A-2 it was +8 points (from 91 to 99); (4) the percentage of data overlap in both condition comparisons was 0%, which, under the conventions of SSR analysis, indicates that the effect of the intervention on the subject's hand motor skills was strong, since the smaller the percentage of overlap, the greater the effect of the independent variable on the dependent variable.

3.2 Discussion

Motor learning for children with physical disabilities fundamentally requires a medium capable of stimulating repeated hand movements without causing boredom or pressure on the child. The measurement conducted in the baseline-1 (A-1) condition showed that, prior to any intervention, the subject achieved only a 66% score, with the lowest achievement observed in the catching aspect, specifically when the ball had to be caught again after bouncing once on the floor. This difficulty is consistent with the statement of Haywood and Getchell (2019) that children with motor impairments require structured and consistent training for their neuromuscular system to function more optimally.

The bekel ball intervention given in condition B was designed in stages, beginning with grasping practice for the ball and the bekel seeds, followed by throwing practice, and finally combined practice of picking up and catching. The researcher provided guidance whenever the subject experienced difficulty, particularly in the eye-hand coordination required while the ball was bouncing. The learning process was conducted in an enjoyable, play-based atmosphere so that the subject did not feel as though undergoing formal training, but rather as though being invited to play a traditional game that simultaneously trained motor ability. This condition is in line with the view of Aini et al. (2022) that bekel ball requires eye-hand coordination, reflex speed, and strong focus when played.

The increase in score from 66% at baseline-1 to a mean of 87.5% during the intervention indicates that the bekel ball game produced an immediate effect on the subject's hand motor skills. A level change of +18 points between conditions A-1 and B, accompanied by 0% data overlap, indicates that all data in the intervention phase fell outside the range of the baseline data, suggesting that the effect of the intervention was strong. The faster improvement observed in the grasping and throwing aspects compared to the catching aspect is also consistent with the principle of motor development, which progresses from simple movements toward more complex and coordinated ones (Gallahue & Ozmun, 2012).

An equally important finding is that the subject's score not only persisted but even increased to 99% in the baseline-2 (A-2) condition, despite the intervention having been withdrawn. This condition indicates that the hand motor skills acquired by the subject during the intervention were of a lasting nature (maintenance effect), rather than merely a temporary improvement in performance dependent on the presence of treatment. This pattern is consistent with the principle of motor learning that skills acquired through repeated movement tend to become consolidated into automatic movement patterns that can be maintained even after structured training has been discontinued (Schmidt & Lee, 2019). The 0% overlap between

conditions B and A-2 further strengthens the conclusion that the effect of playing bekel ball on the subject's hand motor skills occurred in a stable and consistent manner.

It should be noted that the number of sessions in the baseline-1 and baseline-2 phases, each consisting of only one session, means that the trend direction in both phases could not be calculated empirically, so the interpretation of stability remains limited. Nevertheless, the consistent pattern of score increase across the four observation sessions (66 → 84 → 91 → 99), together with the 0% data overlap in both condition-pair comparisons, still provides strong evidence that playing bekel ball has a positive effect on the hand motor skills of children with physical disabilities. This finding reinforces the results of Qolbi et al. (2023) and Fitriani (2024) on regular early-childhood learners, while also extending empirical evidence of the effect of bekel ball to the population of children with physical disabilities, which has not been widely studied specifically.

4. Conclusion

Conclusion

Based on the results of the analysis and discussion presented above, the following conclusions can be drawn. First, the initial condition of hand motor skills of the child with physical disabilities prior to intervention was at a score of 66%, with the lowest achievement observed in the aspect of catching the ball after it bounced on the floor. Second, the subject's hand motor skills improved consistently during the intervention phase, from 84% to 91%, and remained stable, even increasing to 99% in the baseline-2 phase after the intervention was withdrawn. Third, playing bekel ball had a positive effect on the hand motor skills of the child with physical disabilities at SLB A,B,D Negeri Kedungkandang, Malang City, as indicated by the substantial level changes and the 0% percentage of data overlap in both condition comparisons.

Suggestions

Based on the conclusions above, the researcher proposes the following suggestions. (1) For schools, the bekel ball game may be considered as one of the activities within special programs for learners with physical disabilities experiencing hand motor difficulties, by providing an adequately flat and bouncy playing surface. (2) For teachers, bekel ball can be used as an inexpensive, accessible, and enjoyable learning medium or motor therapy, particularly for training the catching aspect, which, based on the findings of this study, requires the most repeated practice. (3) For parents, it is recommended that the bekel ball game also be applied at home so that the improvements achieved during the intervention at school can be sustained. (4) For future researchers, it is recommended to increase the number of sessions in the baseline phases and to expand the number and variation of research subjects so that the trend direction and data stability can be described more convincingly and the research findings can be generalized more broadly.

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