Physical Education Theory and Methodology
Теорія та методика фізичного виховання

ISSN 1993-7989 (print)
ISSN 1993-7997 (online)
ISSN-L 1993-7989

Original Scientific Article

The Influence of a Rhythmic Motor-Learning Intervention on Selected Physical and Physiological Variables among Children with Mild Intellectual Disability

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Accepted for Publication: February 25, 2026
Published: March 30, 2026

DOI: 10.17309/tmfv.2026.2.09

Abstract

Objectives. This experimental study aimed to examine the effects of a 12-week unified rhythmic activity intervention on selected physical and physiological parameters among children with mild intellectual disability.

Materials and Methods. Thirty children (aged 10–14 years) diagnosed with mild intellectual disability (IQ 50–70) were randomly assigned to either an experimental group (n = 15) or a control group (n = 15). The experimental group participated in a structured unified rhythmic activity program, while the control group continued their regular school routines. Pre- and post-intervention assessments included body mass index (BMI), body fat percentage, flexibility, muscular endurance, cardiovascular endurance, resting heart rate (RHR), and vital capacity (VC). A two-way mixed-design ANOVA (2 groups × 2 time points) was employed to evaluate the main and interaction effects.

Results. A significant main effect of time was observed for flexibility ($p < 0.001$, $\eta_p^2 = 0.68$), muscular endurance ($p = 0.002$, $\eta_p^2 = 0.54$), cardiovascular endurance ($p < 0.001$, $\eta_p^2 = 0.72$), RHR ($p = 0.008$, $\eta p^2 = 0.48$), and VC ($p = 0.001$, $\eta_p^2 = 0.58$). Additionally, significant group × time interaction effects were found for flexibility ($p < 0.001$, $\eta_p^2 = 0.62$), muscular endurance ($p = 0.003$, $\eta_p^2 = 0.51$), cardiovascular endurance ($p < 0.001$, $\eta_p^2 = 0.65$), and RHR ($p = 0.012$, $\eta_p^2 = 0.42$), with the experimental group showing superior improvements. No substantial changes were observed for BMI or body fat percentage.

Conclusions. The unified rhythmic activity intervention produced meaningful improvements in flexibility, muscular endurance, cardiovascular fitness, and resting heart rate among children with mild intellectual disability. These findings support incorporating rhythmic movement-based training into adapted physical education programs to enhance physical and physiological outcomes in this population.

Keywords: intellectual disability, rhythmic movement, physical fitness, adapted physical education, cardiovascular health.

Introduction

Intellectual disability (ID) affects approximately 1-3% of the global population, characterized by significant limitations in both intellectual functioning and adaptive behaviour (Chandan & Dubon, 2019). Children with mild intellectual disability (IQ range 50-70) comprise the largest subgroup, representing about 85% of individuals with ID. These children often experience secondary health complications including obesity, poor cardiovascular health, and reduced physical fitness compared to their typically developing peers.

Physical inactivity is highly prevalent among children with intellectual disabilities, with studies reporting that only 9-15% meet recommended physical activity guidelines compared to 40-50% of typically developing children (Fong Yan et al., 2024). This sedentary lifestyle contributes to higher rates of obesity (30-40% prevalence), cardiovascular disease risk, and reduced motor competence (Salaun & Berthouze-Aranda, 2012). The consequences of physical inactivity in this population extend beyond physical health, affecting psychological wellbeing, social participation, and overall quality of life (Fong Yan et al., 2024).

Traditional physical education programs often fail to adequately engage children with intellectual disabilities due to complex instructions, competitive elements, and lack of appropriate modifications (Haegele & Sutherland, 2015). Consequently, there is a critical need for evidence-based, enjoyable, and accessible physical activity interventions specifically designed for this population. Rhythmic activities, which combine movement with music and repetitive patterns, may be particularly suitable due to their structured nature, predictability, and inherent enjoyment (Kalyva et al., 2007).

Unified rhythmic activity represents an integrated approach combining elements of dance, aerobic movement, and rhythmic gymnastics adapted for individuals with intellectual disabilities. The "unified" component emphasizes inclusive participation, social interaction, and peer support (Chandan & Dubon, 2019). Previous study has demonstrated that rhythmic movement programs can improve motor skills, balance, and coordination in children with developmental disabilities (Park & Jee, 2022; Teixeira-Machado et al., 2019). However, comprehensive examination of the effects on both physical profile (body composition, fitness components) and physiological parameters (cardiovascular function, respiratory capacity) remains limited.

Several theoretical frameworks support the use of rhythmic activities for this population. The ecological task analysis model suggests that tasks should be modified to match individual capabilities while maintaining engagement (Newton et al., 2020). Rhythmic activities naturally allow for such modifications through tempo adjustment, movement simplification, and graduated complexity. Additionally, the motivational climate theory indicates that mastery-oriented, non-competitive environments promote sustained participation, characteristics inherent to rhythmic activity programs (Back et al., 2022).

Emerging evidence suggests that music-based movement interventions may offer unique benefits for individuals with intellectual disabilities. The temporal and spatial predictability of rhythmic patterns may facilitate motor planning and execution in populations with coordination difficulties (Thaut et al., 2015). Furthermore, the social and emotional engagement fostered by group rhythmic activities may enhance adherence and psychological outcomes beyond those achieved through conventional exercise (Koch et al., 2014).

Despite promising preliminary findings, several gaps exist in the current literature. Most studies have examined motor skills or isolated fitness components rather than comprehensive physical and physiological profiles. Additionally, methodological limitations including small sample sizes, lack of control groups, and short intervention durations have limited the generalizability of findings. Moreover, few studies have specifically examined children with mild intellectual disability, who represent the largest and potentially most responsive subgroup for physical activity interventions.

Therefore, this study aimed to investigate the effects of a 12-week unified rhythmic activity intervention on selected physical profile components (BMI, body fat percentage, flexibility, muscular endurance, cardiovascular endurance) and physiological factors (resting heart rate, vital capacity) among children with mild intellectual disability.

Materials and Methods

Study Design

This randomized controlled trial was conducted over 14 weeks, including pre-testing (week 1), 12-week intervention period, and post-testing (week 14). Participants were randomly allocated to either an experimental group (unified rhythmic activity intervention) or a control group (regular school activities) using computer-generated random numbers with an allocation ratio of 1:1. All assessments were conducted by trained evaluators blinded to group allocation.

Participants

Thirty children (18 boys and 12 girls), aged 10–14 years and diagnosed with mild intellectual disability, were recruited from two special education institutions: Star Special School and Vidya Vikasini Opportunity School in Coimbatore, Tamil Nadu, India. Participants were diagnosed with mild intellectual disability (IQ 50-70) based on standardized intelligence testing (WISC-IV or Stanford-Binet Intelligence Scales) and adaptive behaviour assessment (Vineland Adaptive Behaviour Scales-II) conducted by certified psychologists.

No significant differences were observed between groups at baseline for any variables (all $p > 0.05$), indicating successful randomization (Table 1).

Table 1. Demographic and Baseline Characteristics of Participants

Characteristic	Experimental (n=15)	Control (n=15)	p-value
Age (years)	13.4 ± 2.0	13.1 ± 2.1	0.542
Gender (Boys/Girls)	9/6	9/6	1.000
IQ Score	61.8 ± 7.2	63.1 ± 6.5	0.483
Height (cm)	145.2 ± 8.6	143.8 ± 9.1	0.674
Body Mass (kg)	42.8 ± 9.2	41.3 ± 8.7	0.656
Session Attendance (%)	94.7 ± 3.2	-	-

Values are mean ± SD. IQ = Intelligence Quotient.

All 30 participants completed the study with 100% retention (experimental group n=15, control group n=15). Attendance in the experimental group averaged 94.7% (34.1 out of 36 sessions). No adverse events or injuries occurred during the intervention period.

Selection Criteria

Participants included in the study were children aged 10–14 years who had been clinically diagnosed with mild intellectual disability, corresponding to an IQ range of 50–70.

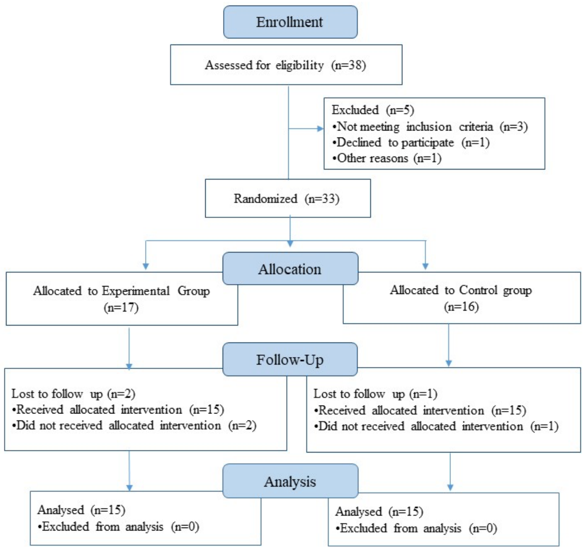

Fig. 1. CONSORT Flowchart

Eligible participants were required to demonstrate the ability to follow simple verbal and visual instructions and to have received medical clearance permitting engagement in physical activities. Written informed consent was obtained from parents or legal guardians, along with assent from the participants themselves. Only children with regular school attendance of at least 80% were included in the study. Participants were excluded if they had severe physical disabilities limiting movement, uncorrected sensory impairments such as vision or hearing deficits, or unstable medical conditions including uncontrolled seizures or cardiac disorders. Those already participating in structured physical activity programs exceeding two hours per week or those absent for more than three intervention sessions were also excluded from the study.

G*Power software (version 3.1) was used to determine sample size. With effect size (f) = 0.50, power = 0.80, alpha = 0.05, number of groups = 2, number of measurements = 2, and correlation among repeated measures = 0.5, a minimum sample size of 26 was required. To account for potential dropouts, 30 participants were recruited.

Ethical Clearance

The study was approved by the Institutional Ethics Committee AUW/IHEC/Phy.Edu/23-24/XPD-01 and conducted according to the Declaration of Helsinki. Written informed consent was obtained from parents/guardians, and verbal assent was obtained from all participants.

Anthropometric Measurements

Height: Measured using a stadiometer (Seca 213, Hamburg, Germany) to the nearest 0.1 cm with participants standing barefoot in an upright position.

Body Mass: Measured using a calibrated digital scale (Seca 813, Hamburg, Germany) to the nearest 0.1 kg, with participants wearing light clothing and barefoot.

Body Mass Index (BMI): Calculated as weight (kg) divided by height squared (m^2) (Khanna et al., 2022).

Body Fat Percentage: Estimated using skinfold thickness measurements at triceps and subscapular sites using a Harpenden skinfold caliper (Baty International, UK). Measurements were taken three times at each site by a trained assessor, and the average was used. Body fat percentage was calculated using age- and gender-specific equations (Slaughter et al., 1988).

Physical Fitness Tests

Flexibility (Sit-and-Reach Test): Participants sat with legs extended and feet against a calibrated sit-and-reach box (Baseline® Sit-and-Reach Box, Fabrication Enterprises, USA). With hands overlapped and palms down, participants slowly reached forward as far as possible, holding the maximum reach for 2 seconds. The distance reached was measured to the nearest 0.5 cm. Two trials were performed with 1-minute rest between trials, and the best score was recorded (Baltaci et al., 2003). The sit-and-reach box was checked and calibrated according to the manufacturer's instructions prior to data collection.

Muscular Endurance (Modified Curl-Up Test): Participants performed curl-ups at a cadence of 20 repetitions per minute (guided by a metronome set to 20 BPM) until exhaustion or 75 repetitions, whichever came first. A calibrated digital metronome (e.g., Soundbrenner Spark; Hong Kong / Germany) was used to ensure precise cadence. Proper form was demonstrated, and the test was terminated if participants could not maintain pace or proper technique for two consecutive repetitions (Macfarlane, 1993). The total number of correctly performed curl-ups was recorded.

Cardiovascular Endurance (6-Minute Walk Test): Following standardized protocols for individuals with intellectual disabilities, participants walked as far as possible in 6 minutes on a marked 30-meter indoor course. Encouragement was provided at regular intervals using standardized phrases (Elmahgoub et al., 2012). The total distance covered (in meters) was recorded using a calibrated digital stopwatch (CASIO HS-80TW, Casio Computer Co., Ltd., Tokyo, Japan) to ensure precise timing and consistency across all trials.

Physiological Measurements

Resting Heart Rate (RHR): Measured after 10 minutes of quiet sitting using a heart rate monitor (Polar H10, Finland). Three measurements were taken at 2-minute intervals, and the average was calculated.

Vital Capacity (VC): Measured using a portable spirometer (Micro Plus Spirometer, CareFusion, UK) following American Thoracic Society guidelines. Participants performed forced vital capacity maneuvers in a standing position. Three acceptable trials were performed with at least 1-minute rest between trials, and the highest value was recorded.

Unified Rhythmic Activity Intervention

Music selection for the intervention involved choosing age-appropriate and culturally familiar songs with clear rhythmic patterns and tempos ranging from 100 to 130 bpm. These musical choices were intended to maintain participants' engagement while providing consistent auditory cues to support movement timing. Adaptations were incorporated

Table 2. Unified Rhythmic Activity Intervention

Component	Description
Training Frequency & Duration	3 sessions/week for 12 weeks (36 sessions total); each session = 45 minutes. Conducted by a qualified Adapted Physical Education instructor experienced with children with intellectual disabilities.
Session Structure	Warm-up (10 min): Light aerobic movements and dynamic stretching to music (100–110 bpm). Main Activity (30 min): Rhythmic movement patterns including: • Basic locomotor skills (walking, marching, skipping) synchronized to music. • Dance-based steps (grapevine, step-touch, chassé). • Simple choreographed patterns (4–8 counts). • Partner and group activities to enhance social interaction. • Gradual progression from simple to complex sequences over the 12 weeks. Cool-down (5 min): Gentle stretching and breathing exercises to slow music (60–70 bpm).
Progression Plan	Weeks 1–4: Emphasis on basic rhythmic patterns, tempo consistency, and familiarization with movements. Weeks 5–8: Inclusion of partner activities, increased complexity of steps, and introduction of slightly faster tempos. Weeks 9–12: Advanced choreographed sequences, group formations, and diverse musical styles.
Music Selection	Age-appropriate, culturally familiar songs; rhythmic clarity with tempo range of 100–130 bpm; music used to maintain engagement and provide timing cues.
Adaptations & Supports	Simplified movements when needed, visual demonstrations, physical prompts, peer assistance, and mastery-oriented positive feedback throughout.

based on individual participant needs, including simplified movement sequences, visual demonstrations, physical prompting, and opportunities for peer support. Throughout the sessions, positive reinforcement and mastery-oriented feedback were emphasized to encourage confidence and skill development. The control group, in contrast, continued with their regular school schedule, which included standard physical education classes conducted twice a week for 30 minutes each, consisting of general activities such as free play, ball games, and basic exercises without any structured rhythmic activity intervention.

Statistical Analysis

Data are presented as mean ± standard deviation (SD). Normality was assessed using the Shapiro-Wilk test. A two-way (2 groups × 2 time points) mixed-design ANOVA was used to analyze the effects of group (experimental vs. control) and time (pre vs. post) on all dependent variables. Partial eta squared (η_p^2) was used as the effect size measure for ANOVA, interpreted as small (<0.06), moderate (0.06-0.13), or large (≥0.14). For significant interactions, paired t-tests were conducted to assess within-group changes, and independent t-tests were used to compare between-group differences at post-intervention. Hedges' g was calculated for effect sizes of t-tests and interpreted as trivial (<0.2), small (0.2-0.6), moderate (>0.6-1.2), or large (>1.2). Percentage change was calculated as [(post-mean - pre-mean)/pre-mean] × 100. Statistical significance was set at $p \leq 0.05$. All analyses were performed using SPSS version 26.0 (IBM Corporation, Armonk, NY, USA).

Results

Main Effect of Time and Group × Time Interaction

Significant main effects of time were observed for flexibility (F=78.42, p<0.001, η_p^2=0.68), muscular endurance (F=42.15, p=0.002, η_p^2=0.54), cardiovascular endurance (F=86.34, p<0.001, η_p^2=0.72), RHR (F=31.28, p=0.008, η_p^2=0.48), and VC (F=38.91, p=0.001, η_p^2=0.58). No significant main effect of time was observed for BMI (F=2.18, p=0.152) or body fat percentage (F=3.42, p=0.074).

Significant group × time interactions were reported for flexibility (F=68.34, p<0.001, η_p^2=0.62), muscular endurance (F=38.72, p=0.003, η_p^2=0.51), cardiovascular endurance (F=72.18, p<0.001, η_p^2=0.65), and RHR (F=28.45, p=0.012, η_p^2=0.42). No significant interactions were observed for BMI (F=0.86, p=0.362), body fat percentage (F=2.91, p=0.098), or VC (F=3.28, p=0.082).

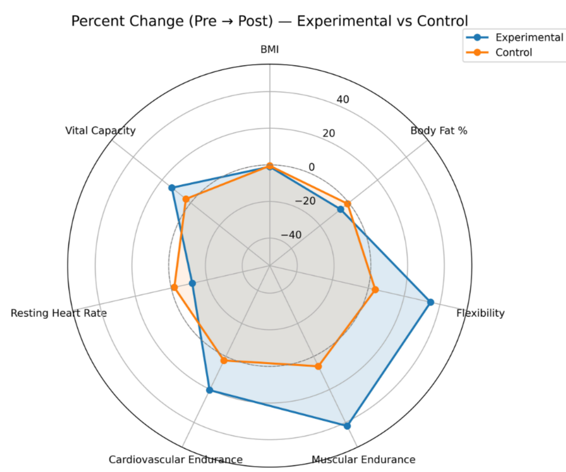

Fig. 2. Radar chart showing percent changes from pre- to post-intervention, with the experimental group demonstrating greater improvements across most variables

Within-Group Changes

The experimental group demonstrated significant improvements across multiple variables, including flexibility (p<0.001, g=1.45, Δ%=+34.78), muscular endurance (p<0.001, g=1.34, Δ%=+42.15), cardiovascular endurance

Table 3. Statistical Outcomes for Both the Groups

Dependent Variables	Group	Baseline	Post 12 Weeks	Δ % (Mean)	Hedges' g	Main Effect: Time			Interaction: Time × Group		
		Mean ± SD				F	p	η_p^2	F	p	η_p^2
BMI (kg/m²)	Experimental	20.3 ± 3.2	20.1 ± 3.1	−0.99	0.06	2.18	0.152	0.07M	0.86	0.362	0.03S
	Control	19.9 ± 2.9	19.8 ± 2.8	−0.50	0.03						
Body Fat (%)	Experimental	24.6 ± 5.4	23.2 ± 5.1	−5.69	0.26	3.42	0.074	0.11M	2.91	0.098	0.09M
	Control	23.8 ± 4.9	23.6 ± 4.8	−0.84	0.04						
Flexibility (cm)	Experimental	18.4 ± 4.2	24.8 ± 4.6*	+34.78	1.45	78.42	<0.001	0.68L	68.34	<0.001	0.62L
	Control	17.9 ± 3.8	18.6 ± 3.9	+3.91	0.18						
Muscular Endurance (reps)	Experimental	22.3 ± 6.8	31.7 ± 7.2*	+42.15	1.34	42.15	0.002	0.54L	38.72	0.003	0.51L
	Control	21.8 ± 6.2	23.1 ± 6.5	+5.96	0.20						
Cardiovascular Endurance (m)	Experimental	412.5 ± 48.3	496.8 ± 52.6*	+20.44	1.68	86.34	<0.001	0.72L	72.18	<0.001	0.65L
	Control	408.2 ± 45.7	418.3 ± 46.9	+2.47	0.22						
Resting Heart Rate (bpm)	Experimental	88.6 ± 8.4	78.2 ± 7.6*	−11.74	1.29	31.28	0.008	0.48L	28.45	0.012	0.42L
	Control	87.3 ± 7.9	85.8 ± 8.1	−1.72	0.19						
Vital Capacity (L)	Experimental	1.82 ± 0.34	2.06 ± 0.38*	+13.19	0.66	38.91	0.001	0.58L	3.28	0.082	0.10M
	Control	1.78 ± 0.31	1.84 ± 0.33	+3.37	0.19						

Note: * – significant difference from pre to post, η_p^2 – partial eta squared. BMI = Body Mass Index. L – large, M – moderate, S – small.

(p<0.001, g=1.68, Δ%=+20.44), resting heart rate (p<0.001, g=1.29, Δ%=-11.74), and vital capacity (p=0.008, g=0.66, Δ%=+13.19). In contrast, the control group showed no significant changes in any of the assessed variables, with all p-values exceeding 0.05 and effect sizes remaining small (g<0.22).

Between-Group Comparisons at Post-Intervention

Independent t-tests at post-intervention revealed significantly better outcomes in the experimental group compared to control for flexibility (t=4.82, p<0.001, g=1.38), muscular endurance (t=4.21, p<0.001, g=1.24), cardiovascular endurance (t=5.34, p<0.001, g=1.56), and RHR (t=-3.78, p=0.001, g=0.92). No significant between-group differences were found for BMI, body fat percentage, or VC at post-intervention.

Discussion

This randomized controlled trial demonstrated that a 12-week unified rhythmic activity intervention significantly improved flexibility, muscular endurance, cardiovascular endurance, and resting heart rate in children with mild intellectual disability. The large effect sizes observed for these variables (η_p^2=0.42-0.72) and substantial percentage improvements (11.74-42.15%) indicate clinically meaningful changes that extend beyond statistical significance.

The experimental group demonstrated a remarkable 34.78% improvement in flexibility compared to only 3.91% in the control group. This substantial gain (6.4 cm mean improvement) aligns with previous research showing that rhythmic movement programs enhance range of motion in individuals with developmental disabilities (Teixeira-Machado & DeSantana, 2019). The repetitive, controlled stretching movements inherent in rhythmic activities, combined with the gradual progression in movement complexity, likely contributed to these improvements. Enhanced flexibility has important functional implications for children with intellectual disabilities, potentially improving posture, reducing injury risk, and facilitating activities of daily living (Farrokhian et al., 2021).

Muscular endurance, measured by the modified curl-up test, improved by 42.15% in the experimental group (9.4 repetitions gain) compared to 5.96% in controls. This finding is consistent with previous studies reporting improved muscular fitness following dance-based interventions in children with disabilities (Joung et al., 2020). The continuous, moderate-intensity movements performed during rhythmic activities likely imposed sufficient muscular demands to stimulate neuromuscular adaptations.

The improvement in core muscular endurance has particular relevance for this population, as adequate core strength is essential for postural control, balance, and functional movement (Shields, 2013). Children with intellectual disabilities often exhibit reduced core strength compared to typically developing peers, contributing to movement difficulties and reduced participation in physical activities (Hartman et al., 2017). The observed improvements suggest that rhythmic activities provide an effective and enjoyable means of developing this critical fitness component.

The 20.44% improvement in 6-minute walk distance (84.3 meters gain) in the experimental group, with large effect size (g=1.68), demonstrates substantial enhancement in cardiovascular fitness. This improvement is particularly noteworthy given that children with intellectual disabilities typically exhibit lower cardiovascular fitness than their typically developing peers and rarely engage in sufficient moderate-to-vigorous physical activity (MVPA) to improve aerobic capacity (Ptomey et al., 2017).

Importantly, the improvement in functional walking capacity has direct implications for daily life activities and community participation. Enhanced cardiovascular fitness may enable children with intellectual disabilities to participate more fully in school activities, recreational pursuits, and social interactions that require sustained physical effort (Teixeira-Machado et al., 2019).

The 11.74% reduction in resting heart rate (10.4 bpm decrease) in the experimental group represents a physiologically significant adaptation indicating improved cardiovascular efficiency. Reduced resting heart rate is a well-established marker of cardiovascular fitness and is associated with reduced cardiovascular disease risk (Collins & Staples, 2017). This finding is particularly important given that individuals with intellectual disabilities exhibit higher prevalence of cardiovascular risk factors and metabolic syndrome compared to the general population (Zhang et al., 2017).

While the experimental group showed a modest reduction in body fat percentage (5.69% decrease), this change did not reach statistical significance, and no significant group × time interaction was observed. This finding contrasts with some previous studies reporting significant body composition improvements following physical activity interventions in individuals with intellectual disabilities (McGarty et al., 2018). Several factors may explain this outcome.

The 12-week intervention was sufficient to improve physical fitness but may have been too short to produce significant changes in body composition, particularly without dietary control. Additionally, the moderate intensity and frequency of rhythmic activities (45 minutes, three times per week) may not have generated the energy deficit necessary for fat mass reduction. Notably, improvements in physical fitness were observed independently of changes in body composition, suggesting that meaningful health benefits may occur even in the absence of substantial weight loss (Blair & Church, 2004). Both groups improved in vital capacity, with the experimental group showing a moderate effect ($g = 0.66$), suggesting potential respiratory benefits with longer intervention duration.

The rhythmic breathing patterns coordinated with movement during rhythmic activities may have contributed to improved respiratory muscle strength and coordination. Additionally, the aerobic nature of the activities may have promoted more efficient breathing patterns and enhanced respiratory function (Liem et al., 2015). Improved vital capacity has functional implications for speech production, sustained physical activity, and overall respiratory health.

Limitations

The study had several limitations including small sample size limiting subgroup analysis, single-site design affecting generalizability, lack of long-term follow-up to assess benefit retention, intervention specificity to one program type, challenges with assessor blinding, and absence of dietary and outside physical activity monitoring. Additionally, motivation and expectancy effects from the novelty and social interaction may have influenced outcomes beyond specific exercise effects.

Future Research Directions

Future research should include larger multi-site trials for enhanced generalizability, extended follow-up periods at 3, 6, and 12 months post-intervention, dose-response studies, comparative effectiveness analyses against other interventions, mechanism studies incorporating neuroimaging and psychological assessments, cost-effectiveness evaluations, inclusion of moderate to severe intellectual disabilities and adult populations, technology integration, combined intervention approaches with nutrition, and qualitative research to understand participant experiences.

Conclusion

This randomized controlled trial demonstrates that a 12-week unified rhythmic activity intervention significantly improves flexibility, muscular endurance, cardiovascular endurance, and resting heart rate in children with mild intellectual disability, with large effect sizes indicating clinically meaningful changes. Future research with larger samples, longer intervention periods, and extended follow-up assessments will help refine our understanding of optimal program characteristics and long-term sustainability of benefits. Additionally, examining the effects of rhythmic activity on broader outcomes including cognitive function, behaviour, quality of life, and social participation would provide a more comprehensive picture of intervention benefits.

Acknowledgments

The authors would like to thank the participating schools, parents, and children for their cooperation and enthusiasm throughout this study. We also acknowledge the dedicated physical education instructors who implemented the intervention with skill and compassion.

AI Transparency

In the preparation of this manuscript, we utilized paperpal AI, as an assistive tool for editing, paraphrasing and improving the language. All AI-generated contents were thoroughly reviewed, verified, and edited by the authors.

Funding

No external funding was received.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Вплив інтервенції з ритмічного моторного навчання на обрані фізичні та фізіологічні показники дітей із легкою інтелектуальною недостатністю

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 9 с., 3 табл., 2 рис., 27 джерел.

Цілі. Мета цього експериментального дослідження полягала у вивченні впливу 12-тижневої інтервенції з уніфікованої ритмічної активності на обрані фізичні та фізіологічні параметри дітей із легкою інтелектуальною недостатністю.

Матеріали та методи. Тридцять дітей (віком 10–14 років) із діагнозом легка інтелектуальна недостатність (IQ 50–70) були розподілені за методом рандомізації на експериментальну ($n = 15$) та контрольну ($n = 15$) групи. Експериментальна група брала участь у структурованій програмі уніфікованої ритмічної активності, тоді як контрольна група продовжувала навчання за стандартною шкільною програмою. На перед- та постінтервенційному етапах проведено аналіз таких показників: індекс маси тіла (ІМТ), відсоток жирової маси в організмі, гнучкість, м’язова витривалість, серцево-судинна витривалість, частота серцевих скорочень (ЧСС) у стані спокою та життєва ємність легень (ЖЄЛ). Для оцінки основних ефектів та ефекту взаємодії було застосовано двофакторний дисперсійний аналіз змішаного дизайну (2 групи × 2 часові точки).

Результати. Значущий основний ефект часу було виявлено для показників гнучкості ($p < 0.001$, $\eta_p^2 = 0.68$), м’язової витривалості ($p = 0.002$, $\eta_p^2 = 0.54$), серцево-судинної витривалості ($p < 0.001$, $\eta_p^2 = 0.72$), ЧСС у стані спокою ($p = 0.008$, $\eta_p^2 = 0.48$) та ЖЄЛ ($p = 0.001$, $\eta_p^2 = 0.58$). Крім того, встановлено значущі ефекти взаємодії група × час для гнучкості ($p < 0.001$, $\eta_p^2 = 0.62$), м’язової витривалості ($p = 0.003$, $\eta_p^2 = 0.51$), серцево-судинної витривалості ($p < 0.001$, $\eta_p^2 = 0.65$) та ЧСС у стані спокою ($p = 0.012$, $\eta_p^2 = 0.42$), причому експериментальна група продемонструвала суттєво кращі результати. Жодних істотних змін щодо ІМТ або відсотка жирової маси в організмі не спостерігалося.

Висновки. Інтервенція з використанням уніфікованої ритмічної активності призвела до суттєвого покращення гнучкості, м’язової витривалості, серцево-судинної підготовленості та частоти серцевих скорочень у стані спокою серед дітей із легкою інтелектуальною недостатністю. Отримані дані свідчать про доцільність включення тренувань на основі ритмічних рухів до програм адаптивного фізичного виховання з метою поліпшення фізичних та фізіологічних показників цієї групи населення.

Ключові слова: інтелектуальна недостатність, ритмічні рухи, фізична підготовленість, адаптивне фізичне виховання, серцево-судинне здоров’я.

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Cite this article as: Baskara Seliyan, V., Mohanraj, M. G. P., Venugopalan, M., Josyula, T., W, V., Salvi, N. M., Astuti, Y., & Karmakar, D. (2026). The Influence of a Rhythmic Motor-Learning Intervention on Selected Physical and Physiological Variables among Children with Mild Intellectual Disability. *Physical Education Theory and Methodology, 26*(2), 311-319. https://doi.org/10.17309/tmfv.2026.2.09

Received: 04.12.2025. Accepted: 25.02.2026. Published: 30.03.2026