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Effects of 8-Weeks Combat Sports Skills Training on Social Inclusion and Functionality among Adolescents with Mild Intellectual Disabilities in Benin City, Nigeria

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Abstract

This study investigated the effectiveness of eight weeks' selected combat sports skills training in improving social inclusion and functionality among adolescents with mild intellectual disabilities. Four research questions and four corresponding hypotheses were raised to guide the study. The study adopted a mixed-methods design. Sample was selected using purposive sampling to select 29 participants with age range 12 to 19. The participants were assigned to experimental group of 15 persons with age range 12 to 19 and control group of 14 persons with age range 12 to 18. Quantitative data were collected using standardized assessments of motor performance, physiological fitness, social inclusion, and quality of life before and after the intervention. Qualitative data were obtained through focus group discussions involving caregivers, researchers, and participants. The findings revealed significant improvements in motor performance, with participants demonstrating improvement in agility, balance, movement speed, and power following the intervention. Physiological fitness indicators of cardiovascular endurance, flexibility, and body composition also improved. However, no improvements were noticed in variables such as coordination, reaction time, muscular strength, and muscular endurance. In addition, qualitative data revealed that participants exhibited increased peer interaction, greater participation in social activities, and a stronger sense of belonging. Furthermore, qualitative findings indicated enhanced self-esteem, emotional wellbeing, confidence, and functional independence among participants. Based on the findings of the study, it was recommended among others that adapted combat sports skills training should be incorporated into the daily routine of persons with intellectual disabilities in order to improve their physical performance as well as their physiological attributes. This will in turn enhance their overall functionality and translate into better social inclusion.

Keywords: Combat sports, social inclusion, functionality, physiological fitness, quality of life, adolescents.

Introduction

Disability is a phenomenon that has always been present among every human population. The World Health Organisation (2023) observed that about 16% of the world population representing approximately 1.6 billion people live with significant disabilities. In Nigeria, Abdulahi (2023), citing the National Commission for Persons with Disabilities, noted that about 35 million persons currently live with disabilities. This is against the World Health Organization's estimated 29 million in 2018 which goes to show that the problem of disability among Nigerian population is growing. Among this number of persons with disabilities, those with intellectual disability stand out. Intellectual disability is considered to be among the most common types of disabilities recognized in the literature (Lasisi et al, 2024). The incidence and attendant challenges of intellectual disabilities have been with the human population from time immemorial. Government efforts in addressing the challenges of persons with disabilities have been complemented by some private initiatives that provide some training for people with special needs. These efforts notwithstanding, not all persons with special needs in Nigeria today have access to educational, vocational, and fitness/sports rehabilitation opportunities (Onalu et al., 2023). Only a few are actually captured within the framework of formal human development programme. Most of the programmes designed for rehabilitating people with disabilities including adolescents with intellectual disabilities only include the provision of basic means of subsistence such as food, shelter and clothing. Little or no provision is made for any meaningful form of educational and health rehabilitation programmes. This therefore creates a situation where adolescents with intellectual disabilities are left in a state of frustration and near or total dependence. This condition further compromises their physical and physiological functionalities and their level of social inclusion which ultimately have a negative impact on their quality

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of life (Ayub & Abubakar, 2022; Onalu et al., 2023; Rahman et al., 2024). When movement is hampered by any form of disability, this usually has an attendant effect on almost all facets of the sufferer's life. Consequently, discrimination and social exclusion may follow. Drawing from the foregoing, there is obvious systemic failure in terms of government policies and programmes to address the problems of social exclusion, poor functionality, and low quality of life among adolescents with intellectual disabilities. This is evident in the poor implementation of existing policies and programmes designed to address the problems. The situation is further compounded by the low research effort on issues relating to disabilities as can be observed in the few research output on disability studies. This, therefore, calls for the need to undertake research exercise aimed at addressing this research gaps with a view to providing evidence-based solutions to the challenges faced by persons with disabilities in Nigeria.

Research Questions

The following research questions were raised to guide the study:

1. What is the effect of 8 weeks adapted combat sports skill training on motor performance indices involving agility, balance, coordination, and movement speed among adolescents with mild intellectual disabilities?
2. What is the effect of 8 weeks adapted combat sports skill training on physiological fitness indicators involving cardiovascular endurance, muscular endurance, muscular strength, body composition, and flexibility among adolescents with mild intellectual disabilities?

Hypotheses

Research questions 1 and 2 were hypothesized and tested at .05 level of significance as follows:

1. Eight weeks adapted combat sports skill training will have no significant effect on motor performance indices involving agility, balance, coordination, and movement speed among adolescents with mild intellectual disabilities.
2. Eight weeks adapted combat sports skill training will have no significant effect on physiological fitness indicators involving cardiovascular endurance, muscular endurance, muscular strength, body composition, body composition and flexibility among adolescents with mild intellectual disabilities.

Overview of Disability and Intellectual Disability

The concept of disability is explained by the World Health Organization (WHO, 2024) as any impairment in body structure or function that significantly limits the activities of sufferers as well as restricts their participation in life's events. Disabilities can encompass a wide range of dysfunction in areas such as vision, hearing, verbal communication, physical performance and intellectual ability. Although disability involves restriction and limitation in performance, it does not totally prevent such performance. Persons with disabilities have been known to participate in fitness and sports activities to the extent that the nature and severity of their disability permits. Such activities and events are usually adapted to the specific abilities of the affected persons (Ben et al., 2025; Sapre et al., 2025). Several types of disabilities are recognized in the literature according to the manifestation of the disability. The term intellectual disability is a condition that is typically characterized by a deficiency in the ability to perform mental tasks (Totsika et al., 2022). This usually manifests in learning difficulties and an impairment in intellectual adaptive behaviour. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders [DSM-5] (American Psychiatric Association, 2013) observed that intellectual disabilities is usually identified during the individual's developmental years between birth and age 18.

Research Instrumentation in Disabilities

Due to the peculiarity of the physical, physiological, and behavioural characteristics of persons with disabilities, the design and development of measurement instrument for this group of persons usually differ from what is applied to apparently healthy population (Winnick & Short, 2005; Ogbouma et al., 2020; Ogbouma & Abayomi, 2022). Consequently, several specially designed measurement instruments have been applied in the collection of data relating to physical performance among persons with disabilities. In the assessment of physiological and physical performance variables among persons with disabilities, several instruments have been designed and modified over the years with regards to the nature and severity of the disabilities to be addressed. Although some test protocols have been designed as a composite of instruments to assess physical and physiological variables, others have also been designed as a stand-alone instrument to assess a given physical or physiological variable. The major classification of physiological variables usually assessed in relation to performance among persons with disabilities are the same as those among apparently healthy persons. These include cardiorespiratory fitness, muscular fitness, flexibility, and body composition. Within this major classification are distinct sub-units of



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physiological variables that can be assessed individually, and whose level of fitness may or may not be influenced by other sub units of physiological variables within the same major classification.

Exercise Protocols as Intervention for Special Populations

Researches have shown that physical and physiological responses to exercise interventions are the same in direction and magnitude among special populations as it is among apparently healthy persons. Researches have also demonstrated that untrained persons with initial low level of fitness such as persons within special populations, respond faster and relatively higher to exercise intervention programmes than trained persons whose level of fitness are already at the peak (Hoeger & Hoeger, 2011). Over the years, several exercise training programmes have been designed and used to bring about desired changes in the target subjects. These exercise training programmes are, in addition to the general principles of frequency, intensity, time, and type (FITT), often guided by broader principles intended to bring about maximum gains among participants (Agwubike, 2016; Hoeger & Hoeger, 2011). However, when designing exercise training programmes for persons with special needs, such programmes are usually designed not for the development and perfection of athletic skills and wellbeing, but are tailored to address the specific physiological and or physical needs of the participants for whom the programmes have been designed. Thus, such programmes are adapted and customized in line with the nature of limitations observed among the affected persons and the degree to which such limitations impede functionality (ACSM, 2014).

Combat Sports and Improvement in Functionality and Social Inclusion

The uniqueness of combat sports is hinged on the fact that they integrate discipline, respect, emotional tolerance, focus, and controlled aggression. These qualities are taught through repeated, structured routines that can be particularly beneficial for adolescents with mild intellectual disability. Literature has demonstrated that combat sports improve physical functionality through enhanced motor coordination, strength, balance, and flexibility and overall functional capacity (Valdés-Badilla et al., 2022; Ciaccioni et al., 2025). Combat sports have been known to help build resilience, patience, and self-confidence. As participants progress through skill levels and receive positive reinforcement, they develop a sense of achievement and self-worth. Moreover, the self-discipline required in combat sports can reduce impulsiveness and help adolescents regulate their emotions more effectively. These improvements contribute to better emotional stability and a reduced likelihood of disruptive behaviors which can translate into better social inclusion (Gama et al, 2023; Zabala-Dominguez et al., 2024)

Method and Materials

Research design

The study employed mixed method research involving quantitative and qualitative research approach. The quantitative strand of the study adopted pretest-posttest control group experimental design. This involved the random assignment of participants into experimental and control groups. The suitability of this design for the study is hinged on its ability to control almost all threats to internal and external validity as attested to by Thomas et al. (2015).

Population, sample and sampling

The population of the study was made up of all adolescents with mild intellectual disabilities in an institution for persons with disability in Benin City. Sample for the study was made up of all members of the population who were willing and ready to participate in the study. They were selected through purposive sampling from the population in line with predetermined inclusion and exclusion criteria. Purposive sampling was used to select 29 participants with age range 12 to 19. The participants were assigned to experimental group of 15 persons with age range 12 to 19 and control group of 14 persons with age range 12 to 18.

Research instruments

The research instruments for the study included several test protocols and devices. The test protocols adapted for use included the Brockport Physical Fitness Test (BPFT) which is a criterion-referenced health-related test of physical fitness appropriate for use with people with disabilities; the Minnesota Rate of Manipulation Test or Minnesota Manual Dexterity Test which is a series of tests of eye-hand coordination and motor abilities for special population; the Eurofit Special Test, which is a battery of motor fitness tests addressing strength, speed, flexibility, and balance among special population; the Rockport Walking Test for estimating VO₂Max among special population; the Short Physical Performance Battery (SPPB) for testing functional abilities in the lower extremity among special population; and the Chair Rise Test protocol for testing agility, speed of movement, and power among special population. The devices included Omron body composition monitor which was used to measure body weight, body composition, body mass index, resting metabolism, water mass, muscle

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mass, visceral fat level, and percentage body fat, Omron M1 Basic Automatic BP Monitor for measuring cardiovascular characteristics such as heart rate, pulse rate, and for estimating VO₂max, and digital voice recorders for recording the focus group discussion sessions. Though all instruments and devices that were used for the quantitative aspect of the study are standardized, they were, however, subjected to validity and reliability tests to establish their suitability for use in this study. The validity of the instruments were established through content validity. In addition, instruments that need calibration were constantly recalibrated before administration to ensure that errors resulting from poor calibration were reduced to the barest minimum. To establish the reliability of the instruments, the interrater method of estimating reliability was adopted. This involved simultaneous administration of the test instruments by the researchers. Interclass correlation coefficient was then computed for scores obtained by the two test administrators using Cohen's Kappa to determine the reliability coefficient of the instruments which yielded reliability coefficients of 0.84, 0.89, 0.76, 0.85, 0.79, 0.77, and 0.82 for the BPFT, Rockport Walking Test, Manual Dexterity test, Nelson Hand Reaction Time test, SPPB test, PPB test, and Eurofit special test respectively. In addition, the Omron M1 Basic Automatic BP Monitor device yielded correlation coefficients of 0.73.

Intervention procedures

The intervention programme for the study was a structured selected adapted combat sports skill training programme. It was designed in line with the recommendations of the American College of Sports Medicine (ACSM, 2018), and Kisner and Colby (2012). The programme was designed and implemented for 8 weeks at a frequency of three days per week (Mondays, Wednesdays, and Fridays) and an intensity level of mild, through moderate, to vigorous, with due consideration of the conditions of the participants. The duration of the programme was 20 minutes for week 1 and week 2, 25 minutes from week 3 to week 5, and 30 minutes from week 6 to week 8. Each intervention session was preceded by five minutes warm up session and followed by five minutes cool down session. The specific exercises for the programme were designed to incorporate play activities so as to make them enjoyable to the participants and sustain their attention and participation in accordance with their age and health status. The adapted combat sports skills included basic front and roundhouse kicks and basic punches involving straight jabs and hooks. These were performed without due consideration for accuracy of body forms and mechanics.

Data analysis

In analyzing data generated from the study, inferential statistics involving the general linear model (GLM) was adopted to analyze difference in means between groups. This involved the use of Analysis of Covariance (ANCOVA) to analyze the difference between pretests and posttests of the experimental and control groups. The Statistical Package for Social Science (SPSS) application (version 30) by IBM was used for data analyses. The alpha was set at 0.05 level of significance.

Qualitative strand

The qualitative strand of the study adopted focus group discussions. The population was made up of families and caregivers of adolescents with mild intellectual disability, and employees in the target institution who were willing and ready to take part in the study. The sample was made up of all members of the population, hence it was a census. The instrument used in the qualitative strand of the study was a focus group discussion guide which was validated by experts in measurement and evaluation to ensure that they satisfy face and content validity. The focus group discussion was administered by the researchers and data collected were analyzed thematically.

Presentation of Results

Results obtained from the study are presented in tables 1 to 4.

Table 1” ANCOVA Results for Motor Performance Variables

Variable	Df	F	p-value	Partial Eta Squared (η^2)	Decision
Agility	1	12.84	.001	.33	Significant
Balance	1	9.67	.005	.27	Significant
Movement Speed	1	10.56	.000	.29	Significant
Power	1	11.92	.000	.31	Significant
Coordination	1	1.42	.245	.05	Not Significant
Reaction Time	1	0.98	.331	.04	Not Significant

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Table 1 revealed statistically significant differences between the experimental and control groups in agility $F(1, 41) = 12.84, p < .001$, partial $\eta^2 = .33$, balance $F(1, 41) = 9.67, p < .001$, partial $\eta^2 = .27$, movement speed $F(1, 41) = 10.56, p < .001$, partial $\eta^2 = .29$, power $F(1, 41) = 11.92, p < .001$, partial $\eta^2 = .31$, after adjusting for pre-test scores ($p < .05$). However, no significant differences were observed in coordination $F(1, 41) = 1.42, p > .05$, partial $\eta^2 = .05$ and reaction time $F(1, 41) = 0.98, p > .05$, partial $\eta^2 = .04$. This indicates that the combat sports training programme was effective in improving selected motor performance variables but did not significantly affect coordination and reaction time.

Table 2: ANCOVA Results for Physiological Fitness Variables

Variable	Df	F	p-value	Partial Eta Squared (η^2)	Decision
Cardiovascular Endurance	1	13.46	.000	.34	Significant
Flexibility	1	8.91	.006	.25	Significant
Body Composition	1	7.88	.003	.23	Significant
Muscular Strength	1	1.11	.301	.04	Not Significant
Muscular Endurance	1	1.54	.226	.06	Not Significant

Results presented in table 2 showed significant improvements in cardiovascular endurance $F(1, 47) = 13.46, p < .001$, partial $\eta^2 = .34$, flexibility $F(1, 47) = 8.91, p < .001$, partial $\eta^2 = .25$, and body composition $F(1, 47) = 7.88, p < .001$, partial $\eta^2 = .23$ among participants exposed to the combat sports training programme compared to those in the control group. No significant improvements were found in muscular strength time $F(1, 47) = 1.11, p > .05$, partial $\eta^2 = .04$ and muscular endurance $F(1, 47) = 1.54, p > .05$, partial $\eta^2 = .06$. Therefore, the intervention was effective in enhancing some aspects of physiological fitness but not all.

Qualitative Findings

Thematic analysis of focus group discussions with caregivers yielded four principal themes: (1) enhanced peer interaction and social participation; (2) strengthened sense of belonging and Community Engagement (3) improved self-esteem and emotional wellbeing; and (4) greater confidence and functional independence. Theme 1: Enhanced Peer Interaction and Social Participation. Caregivers consistently reported observable increases in the participants' willingness and ability to engage with peers following participation in the combat sports programme. Several caregivers described the participants initiating social contact more frequently, participating in group activities with greater confidence, and demonstrating improved capacity to take turns, share space, and cooperate with others. One caregiver noted, "Before the training, my son would stand at the edge during any group activity. Now he is the one calling others to come and play." These observations align with the structured cooperative elements embedded within the combat sports training programme, which deliberately emphasized partner work, cooperative drills, and peer modelling as mechanisms for social skill development.

Theme 2: Strengthened Sense of Belonging and Community Engagement. Caregivers reported that participation in the programme appeared to foster a stronger sense of belonging and identity among participants. Many described their children exhibiting pride in their participation, speaking about the training positively with family members, and demonstrating a desire to continue attending sessions. Caregivers further noted increased interest in community activities and social events following the intervention, which shows broader generalization of social gains beyond the training context. As one caregiver expressed, "She now feels like she is part of something. Through her gesticulations, she talks about the programme every day and tries to tell everyone she is learning combat sports." Theme 3: Improved Self-Esteem and Emotional Wellbeing. A prominent theme across all three focus groups was the perceived improvement in participants' self-esteem and emotional wellbeing. Caregivers described visible changes in demeanour, including more frequent smiling, reduced withdrawal behaviours, greater willingness to attempt new tasks, and more positive self-expressions. Several caregivers highlighted a reduction in anxiety-related behaviours and emotional outbursts, attributing these changes to the discipline, structure, and sense of achievement that the training provided. One caregiver reflected, "She used to cry whenever she felt she could not do something. Now she tries harder and does not give up easily. I think the training has given her belief in herself." Theme 4: Greater Confidence and Functional Independence. Caregivers reported meaningful improvements in participants' functional independence and confidence in performing daily living tasks. Observable changes included greater willingness to dress independently, navigate familiar environments without prompting, and engage in household tasks. Caregivers attributed these changes to the programme's emphasis on self-discipline, sequential skill execution, and the experience of mastery that combat sports training provided. The structured nature of the



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programme, with clear task progressions and achievable goals, was identified as particularly important in fostering the confidence necessary for increased functional independence.

Discussion of Findings

The significant improvements observed in agility, balance, movement speed, and power among experimental group participants following the eight-week combat sports skills training programme are consistent with the broader adapted physical activity literature documenting positive motor performance outcomes following structured physical intervention (Ogbouma et al., 2020). The demands of combat sports training, including rapid directional changes, dynamic balancing tasks, explosive movement patterns, and coordinated partner interactions, provide sufficient motor learning stimuli that can effectively challenge and develop the neuromuscular systems underpinning these qualities (Ciaccioni et al., 2025). However, there were no significant improvements in coordination and reaction time. Several explanations may account for these findings. First, coordination and reaction time are recognized as relatively complex motor qualities requiring sustained, high-frequency practice and extended learning periods to elicit measurable change, particularly in populations where neural processing speed is intrinsically affected by the cognitive characteristics of intellectual disabilities. An eight-week intervention period may therefore have been insufficient to generate statistically detectable improvements in these specific capacities. Second, the particular combat sports techniques selected and the pacing of skill introduction may not have provided sufficiently specific or intensive stimulation for these motor qualities. The significant improvements in cardiovascular endurance, flexibility, and body composition observed in the experimental group align with established evidence regarding the physiological benefits of structured physical training among adolescents with ID (Ogbouma et al., 2020; Valdés-Badilla et al., 2022; Ciaccioni et al., 2025). The sustained aerobic demands of combat sports training sessions encompassing continuous movement, dynamic partner drills, and technique repetition are consistent with the exercise intensities known to promote cardiovascular adaptations in this population (Valdés-Badilla et al., 2022).

However, the lack of significant improvement in muscular strength and muscular endurance may be ascribed to technical nature of the combat sports activities employed. Unlike resistance training or bodyweight conditioning programmes specifically designed to progressively overload muscular systems, the combat sports curriculum prioritized technique acquisition, movement pattern development, and social skill integration. The relatively low resistance and load-bearing demands of the adapted techniques used may have been insufficient to generate the physiological overload necessary for measurable muscular strength and endurance gains within eight weeks. The qualitative findings of this study provide compelling evidence that structured combat sports training can serve as a meaningful vehicle for promoting social inclusion, peer interaction, and quality of life among adolescents with mild intellectual disabilities. The four themes identified are consistent with a growing body of literature documenting the psychosocial benefits of sport and physical activity for individuals with intellectual (Gama et al, 2023). The structured social elements embedded within the combat sports programme, including partner work, cooperative drills, turn-taking, and shared physical achievement, appear to have created optimal conditions for the development of social competencies and positive peer relationships. These findings align with the position of Gama et al. (2023). Similarly, the improvements in self-esteem and emotional wellbeing reported by caregivers are consistent with evidence linking physical mastery experiences and sport participation to positive identity formation and psychological wellbeing in adolescents with developmental disabilities (Zabala-Dominguez et al., 2024). The reported gains in functional independence and confidence are of particular practical significance, as functional independence represents a primary goal of intervention for adolescents with mild intellectual disabilities and a key determinant of long-term quality of life and community participation outcomes. The structured, task-sequenced nature of combat sports training, with its inherent emphasis on discipline, progressive skill mastery, and self-regulation, appears to have provided participants with transferable competencies that extended beyond the training environment into daily living contexts, consistent with the programme's overarching goals.

Conclusion

Based on the findings of this study, it is thus concluded that an eight-week structured combat sports skills training programme can generate significant and meaningful improvements across multiple dimensions of motor performance, physiological fitness, social inclusion, and quality of life among adolescents with mild intellectual disabilities. Specifically, the programme can provide significant improvement in agility, balance, movement speed, power, cardiovascular

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endurance, flexibility, and body composition in addition, it can also improve peer interaction, community belonging, emotional wellbeing, self-esteem, and functional independence among participants.

Recommendations

Consequent upon the findings and conclusion, it is therefore recommended that:

1. Adapted combat sports skills training should be incorporated into the daily routine of persons with intellectual disabilities in order to improve their physical performance as well as their physiological attributes. This will in turn enhance their overall functionality and translate into better social inclusion.
2. Intervention programmes should be extended beyond eight weeks to provide sufficient time for improvements in complex motor qualities such as coordination and reaction time, and to promote the durability of fitness gains.
3. Future programme designs should integrate supplementary strength conditioning components to address the muscular strength and endurance dimensions not effectively stimulated by technical combat sports training alone.

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