

Effectiveness of Yoga-Zumba Exercise Program in Enhancing the Physical Fitness Level of Junior High School Learners

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Publication history:

Received: September 14, 2026

Accepted: October 20, 2026

Revised: October 16, 2026

Published: October 21, 2026

International Journal of Sustainable and Integrated Studies, Vol. 1, No. 3, pp. 702–712, October 2026.

Abstract

This study examined changes in physical fitness among Grade 7 learners following a 10-week Yoga-Zumba program at SCALA Integrated School in Nagtipunan, Quirino. Guided by Experiential Learning Theory, the Theory of Multiple Intelligences, and Social Cognitive Theory, the study employed a quantitative one-group pretest-posttest design. Thirty purposively selected learners participated in three 60-minute sessions weekly. Data were collected through a demographic information template and physical fitness assessments administered before and after the intervention. Significant changes were observed in body mass index, push-up repetitions, plank duration, sit-and-reach performance, and left-side shoulder flexibility. Height also increased significantly, while changes in body weight, starting and finishing heart rates, and right-side shoulder flexibility were not statistically significant. The findings suggest favorable changes in selected muscular fitness and flexibility outcomes following the program. However, the absence of a comparison group and long-term follow-up limits causal conclusions and the assessment of sustained effects. Further controlled studies and longer-term monitoring are recommended. The study aligns with Sustainable Development Goal 3 (Good Health and Well-Being) and Sustainable Development Goal 4 (Quality Education) by informing structured school-based physical activities. Its sustainability contribution lies in supporting evidence-informed physical education planning and school-based health promotion.

Keywords: Adolescent Physical Fitness, Flexibility, Grade 7 Learners, Muscular Endurance, School-Based Exercise, Yoga-Zumba

1. Introduction

Physical inactivity among adolescents was identified as a significant public health and educational concern because of its association with poor cardiovascular fitness, reduced muscular performance, unhealthy body composition, and psychological difficulties. School-based physical activity programs were recognized as important strategies for addressing these concerns through structured exercises responsive to learners' developmental needs. This study investigated the effectiveness of a combined Yoga-Zumba exercise program in enhancing the physical fitness of Grade 7 learners at SCALA Integrated School, Nagtipunan, Quirino. The intervention integrated yoga's controlled postures, flexibility exercises, and body awareness with Zumba's rhythmic aerobic movements. The investigation focused on body composition, cardiovascular endurance, muscular strength, and flexibility and was grounded in recent empirical evidence and established educational and behavioral theories.

Adolescent physical inactivity was recognized as a persistent challenge to the promotion of healthy lifestyles and physical development. The World Health Organization (2020) recommends that children and adolescents aged 5–17 years engage in an average of at least 60 minutes of moderate-to-vigorous physical activity daily across the week. However, global evidence indicated that more than 80% of adolescents failed to meet recommended physical activity levels, emphasizing the need for accessible and sustainable interventions (World Health Organization, 2022). Physical activity plays an important role in cardiovascular health, muscular fitness, healthy weight management, and psychological well-being. An umbrella review demonstrated that structured physical activity interventions improved selected psychosocial outcomes among children and adolescents, although the strength of evidence varied across outcomes (Purgato et al., 2024). Schools were identified as important environments for addressing physical inactivity because they provided regular opportunities for organized exercise and health education. A systematic review and meta-analysis found that school-based interventions produced small positive improvements in physical activity participation, particularly during school hours (Moeller et al., 2024). Similarly, Jerebine et al. (2024) reported that school-based interventions incorporating multiple aspects of physical literacy improved physical competencies, although evidence for broader psychosocial and behavioral outcomes remained mixed. These findings emphasized the importance of developing structured, engaging, and developmentally appropriate physical education activities. Yoga and Zumba were identified as complementary approaches to physical fitness development. Yoga emphasizes controlled movements, stretching, balance, and body awareness, whereas Zumba incorporates rhythmic dance and aerobic exercises that promote cardiovascular activity and muscular engagement. Bağkur et al. (2024) demonstrated improvements in selected physical fitness parameters following a school-based yoga intervention among preadolescent children. Similarly, Rutkowski and Chwałczyńska (2025) investigated a 10-week yoga intervention among children aged 10–13 years and reported favorable physical fitness outcomes. Nigg (2024) also examined school-based Hatha yoga and identified outcomes comparable to physical education in selected physical activity and psychosocial indicators. Evidence involving Zumba indicated potential improvements in cardiovascular fitness, flexibility, muscular performance, and body composition (Choudhary & Dubey, 2024a). These findings provided the foundation for examining the combined Yoga-Zumba exercise program among junior high school learners.

Health-related physical fitness comprises cardiovascular endurance, muscular strength and endurance, flexibility, and body composition. These components serve as indicators of learners' physical capabilities and areas requiring improvement. A systematic review and network meta-analysis involving 66 school-based intervention studies found that different exercise modalities produced distinct effects on muscular fitness, cardiorespiratory fitness, and body composition, with combined training demonstrating advantages for selected outcomes (Wu et al., 2023). Pinho et al. (2024) similarly reported that supervised and structured physical exercise improved muscular strength, cardiorespiratory fitness, and muscular power among children and adolescents. These findings supported the investigation of multicomponent physical activity interventions. Cardiovascular endurance refers to the capacity of the circulatory and respiratory systems to sustain physical activity. Previous research established the importance of aerobic exercise in developing this fitness component. Pinho et al. (2024) demonstrated that supervised aerobic and other structured exercise interventions improved cardiorespiratory fitness among young participants. Zumba incorporated continuous rhythmic movement that stimulated aerobic activity. Ljubojevic et al. (2023) reported improvements in respiratory function and selected body composition indicators following an eight-week Zumba intervention among previously inactive women. Although these findings involved adults, they provided supplementary evidence of Zumba's physiological effects. In a Philippine study involving overweight and obese Grade 7 and 8 learners, Dangan et al. (2024) documented improvements in selected cardiovascular health indicators, while aerobic capacity findings were less consistent. These findings indicated that cardiovascular outcomes needed to be assessed directly rather than assumed to improve uniformly. Muscular strength and endurance were also examined as essential components of physical fitness. Yoga incorporated static and sustained postures that required muscular control, while Zumba involved dynamic movements that activated different muscle groups. Bağkur et al. (2024) reported improvements in selected fitness parameters after structured yoga participation. Likewise, Choudhary and Dubey (2024a) documented improvements in muscular performance following an eight-week Zumba program. In school-based exercise research, combined training was associated with favorable muscular fitness outcomes, including push-up performance (Wu et al., 2023). These findings supported the inclusion of muscular strength assessment in the Yoga-Zumba intervention. Flexibility was another important component of health-related physical fitness because of its contribution to joint mobility and efficient physical movement. Yoga incorporated stretching and controlled postures intended to improve range of motion, while Zumba provided dynamic movements involving the upper and lower extremities. Donti et al. (2022), in a systematic review and meta-analysis, examined flexibility development during childhood and adolescence and identified the relevance of structured stretching interventions. Bağkur et al. (2024) also documented flexibility improvements following yoga practice among school-aged children. Similarly, Rutkowski and Chwałczyńska (2025) reported favorable outcomes in physical fitness assessments that included flexibility-related measures. These findings provided the empirical basis for evaluating flexibility before and after the combined exercise intervention. Body composition represented another important dimension of adolescent health-related fitness. Physical activity programs were associated with weight management through increased energy expenditure and physiological adaptation. Caner and Erdoğan Yüce (2025), in a systematic review and meta-analysis, found that

yoga interventions improved BMI and body fat percentage among children and adolescents with overweight or obesity. Research involving Zumba also reported favorable changes in body composition among sedentary women (Ljubojevic et al., 2023). More directly relevant to the Philippine educational context, Dangan et al. (2024) reported improvements in weight management and BMI outcomes among overweight and obese learners participating in a Zumba intervention. These findings supported the inclusion of BMI as an accessible anthropometric indicator in the present study, although BMI alone does not directly measure body fat or fully describe body composition. Beyond physiological outcomes, participation and motivation were identified as important factors influencing the sustainability of physical activity programs. Yamasaki et al. (2021) examined factors associated with regular Zumba participation in Cebu Province, Philippines, and highlighted the relevance of social and behavioral influences on exercise engagement. Furthermore, Martin et al. (2024) reviewed school-based yoga programs and identified potential contributions to classroom atmosphere and well-being. Simpson et al. (2024) also found that physical activity interventions, including yoga-based approaches, showed potential benefits for mental health outcomes among at-risk children and adolescents, although methodological limitations affected the certainty of the findings. These studies indicated that school-based exercise programs offered potential benefits beyond physical performance while emphasizing the importance of evaluating specific intervention outcomes. Collectively, the reviewed studies demonstrated that yoga and Zumba offered potential benefits for physical fitness development. However, the available evidence was stronger for individual interventions than for programs directly combining both exercise modalities. This distinction established the rationale for investigating the Yoga-Zumba exercise program as a structured intervention targeting multiple health-related physical fitness components among junior high school learners.

Physical inactivity among adolescents was identified as a global concern despite international efforts to promote active lifestyles. The World Health Organization (2022) emphasized that insufficient physical activity contributed to preventable health risks and required coordinated action across educational, community, and public health institutions. School-based interventions consequently gained attention as strategies for increasing physical activity and supporting healthier behaviors. However, previous evidence indicated that improvements in physical activity participation were often modest, emphasizing the importance of evaluating program implementation and effectiveness within particular educational settings (Moeller et al., 2024). In the Philippines, the 2022 Philippine Report Card on Physical Activity for Children and Adolescents identified insufficient physical activity as a major concern among Filipino youth. The report documented that most children and adolescents did not achieve recommended physical activity levels and emphasized the need for improved school, community, and policy interventions (Cagas et al., 2022). The report drew on existing national surveillance data, including earlier estimates indicating that approximately 84.6% of Filipino adolescents aged 10–17 years were insufficiently active. This figure represented previously collected data rather than a new estimate for 2026. Furthermore, Palad et al. (2023) examined Philippine policies promoting physical activity among young people and identified the importance of strengthening policy implementation and translating institutional commitments into effective programs. The Department of Education issued DepEd Order No. 034, s. 2019, titled Revised Physical Fitness Test Manual, which established guidelines for physical fitness assessment in schools (Department of Education, 2019). The policy provided an institutional basis for assessing learners' fitness levels and identifying physical fitness components requiring improvement. Its relevance to the present investigation centered on the use of school-based physical fitness assessments before and after the intervention. Within the Schools Division of Quirino, particularly Nagtipunan North District, the study examined a localized approach to physical fitness development. At SCALA (Sarandi Castillo Ladia) Integrated School, the Zumba fitness program developed by Winie G. Dangan was adapted through the integration of yoga exercises. The original Zumba intervention had been investigated among overweight and obese junior high school learners and demonstrated favorable changes in selected physical fitness and anthropometric indicators (Dangan et al., 2024). The present investigation extended this approach by incorporating yoga and examining its effects among Grade 7 learners. Through this adaptation, the study sought to generate context-specific evidence that could inform physical education practices and school-based fitness initiatives.

The study was anchored in Experiential Learning Theory, the Theory of Multiple Intelligences, and Social Cognitive Theory, complemented by contemporary evidence on physical activity motivation and exercise adaptation. Experiential Learning Theory explains that learning occurs through a continuous process involving concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). The theory provided a foundation for understanding how learners developed movement competencies through active participation, repeated practice, and reflection during Yoga-Zumba activities. The intervention incorporated practical learning experiences that allowed learners to execute, observe, and refine physical movements. The Theory of Multiple Intelligences recognizes that individuals possess different intellectual capacities, including bodily-kinesthetic, musical, interpersonal, and intrapersonal abilities (Gardner, 1983). These dimensions were relevant to the Yoga-Zumba intervention because it integrated coordinated bodily movements, rhythmic music, group participation, and individual body awareness. The framework supported the use of varied physical activities that accommodated different learner capabilities and forms of engagement. Social Cognitive Theory emphasizes the reciprocal relationships among individual characteristics, behavior, and environmental influences (Bandura,

1986). Within the study, this perspective explained how teacher guidance, peer participation, and structured exercise opportunities could influence learners' engagement in physical activity. Recent Philippine research on Zumba participation also emphasized the relevance of social and behavioral influences in maintaining exercise practices (Yamasaki et al., 2021). Contemporary motivational research provided further support for the intervention. Fernández-Espínola et al. (2022), in a systematic review and meta-analysis, found that interventions informed by achievement goal and self-determination theories improved students' intentions to remain physically active. However, Tapia-Serrano et al. (2023) reported that self-determination theory-based interventions conducted outside school settings did not produce consistently significant improvements in motivation or physical activity outcomes. These findings demonstrated that motivational strategies could inform exercise program design, although their effectiveness depended on the intervention and its context. The physiological basis of the program was supported by research on structured and supervised exercise. Pinho et al. (2024) identified exercise type, frequency, session duration, and participant characteristics as important considerations in developing physical fitness interventions for young people. Similarly, Wu et al. (2023) demonstrated that different exercise modalities produced varying improvements across fitness components. These findings supported the integration of aerobic conditioning, muscular engagement, and flexibility exercises within the Yoga-Zumba program. The study adopted a pre-intervention assessment, intervention implementation, and post-intervention assessment framework. The Yoga-Zumba program consisted of three 60-minute sessions weekly over 10 weeks, totaling 30 sessions. It integrated yoga postures, rhythmic aerobic dance, and strengthening movements at varying levels of exercise intensity. Physical fitness was evaluated through BMI-based anthropometric measurements, cardiovascular endurance, muscular strength, and flexibility assessments. Age, sex, ethnicity, and parental income were included as demographic variables to examine differences in fitness outcomes across learner groups.

The reviewed literature established that yoga, Zumba, and other structured physical activity programs improved selected components of physical fitness. Nevertheless, limited directly applicable evidence was identified concerning interventions combining yoga and Zumba within a single structured program among junior high school learners. Previous investigations focused primarily on individual exercise modalities, specific fitness outcomes, or populations outside the local educational context. Although systematic reviews supported the effectiveness of several school-based exercise approaches, they also identified variations in intervention outcomes and the need for additional high-quality evaluations (Wu et al., 2023; Moeller et al., 2024). The present investigation addressed this gap by examining the combined Yoga-Zumba exercise program among Grade 7 learners at SCALA Integrated School, Nagtipunan North District, Schools Division of Quirino, during the 2025–2026 school year. Specifically, the study described the demographic characteristics of learners in terms of age, sex, ethnicity, and parental income; assessed their body composition, cardiovascular endurance, muscular strength, and flexibility before and after the intervention; determined whether significant differences existed in physical fitness gain scores following the intervention; and examined whether physical fitness outcomes differed significantly according to demographic characteristics. The investigation tested two null hypotheses. The first null hypothesis stated that there were no statistically significant differences between learners' pre-intervention and post-intervention physical fitness measurements. The second null hypothesis stated that post-intervention physical fitness measurements did not differ significantly when learners were grouped according to age, sex, ethnicity, and parental income. The study was delimited to the identified Grade 7 learners and the 10-week Yoga-Zumba intervention. It did not directly compare the combined program with other exercise interventions or examine long-term effects beyond the implementation period. Dietary practices and other potential influences on fitness outcomes were not comprehensively controlled. Despite these delimitations, the investigation generated evidence intended to inform the development of school-based physical fitness programs within the local educational context.

The study was aligned with Sustainable Development Goal 3 (Good Health and Well-Being) through its examination of adolescent physical fitness and structured physical activity as a health-promoting intervention. By evaluating changes in cardiovascular endurance, muscular strength, flexibility, and BMI-based body composition, the investigation addressed fitness dimensions relevant to healthier lifestyles and the prevention of physical inactivity. This alignment was consistent with international recommendations emphasizing the importance of accessible physical activity opportunities for young people (World Health Organization, 2022). The study also supported Sustainable Development Goal 4 (Quality Education) through its investigation of an alternative approach to school-based physical education. The Yoga-Zumba intervention incorporated movement-based learning, structured participation, and varied exercise experiences intended to support physical fitness development. Recent research emphasized the importance of school-based programs in promoting physical literacy and supporting children's movement competencies (Jerebine et al., 2024). Accordingly, the study addressed the relationship between health promotion and educational development through the evaluation of a school-based exercise intervention.

The study contributed evidence relevant to public health sustainability by investigating a structured physical activity intervention intended to improve adolescent fitness and encourage healthier lifestyles. The investigation provided a basis for identifying physical fitness needs and evaluating appropriate school-based exercise activities. Its contribution to educational sustainability involved generating school-specific evidence that MAPEH teachers

could use to evaluate movement-based instructional approaches and strengthen physical education practices. At the institutional level, the study provided information that school administrators could consider in developing curricular and co-curricular fitness initiatives, planning physical activity programs, and improving fitness assessment practices. It also established a basis for future researchers to investigate combined exercise interventions across different learner populations, intervention durations, and educational settings. These potential contributions reflected the importance of integrating health promotion into school programs while recognizing that the practical sustainability and long-term effectiveness of the intervention required further evaluation.

2. Materials and Methods

2.1 Research Design

The study employed a quantitative approach using a one-group pretest-posttest design. Descriptive statistics were used to summarize participants' demographic characteristics and baseline physical fitness measurements, while pre-intervention and post-intervention assessments were conducted to examine changes in physical fitness following the 10-week Yoga-Zumba exercise program. The study did not include a control or comparison group. Consequently, the findings established changes over time but could not independently determine whether these changes were caused by the intervention. Related quantitative exercise studies by Vasudevan et al. (2023) and Li et al. (2023) provided methodological examples of evaluating structured physical activity interventions, although their study populations and research designs differed from those of the present investigation.

2.2 Locale of the Study

The study was conducted at SCALA Integrated School, Nagtipunan North District, Schools Division of Quirino, Region II, Cagayan Valley, Philippines. The school served learners from Nagtipunan North and surrounding communities and provided educational and extracurricular activities supporting students' physical development and overall well-being. The school served as the research setting because the Yoga-Zumba exercise program was implemented as an extracurricular physical fitness activity. The intervention provided a structured opportunity to examine physical fitness development among Grade 7 learners within their existing educational environment.

2.3 Respondents of the Study

The respondents consisted of 30 Grade 7 learners enrolled at SCALA Integrated School during the 2025-2026 school year. The total Grade 7 population comprised 56 learners, of whom 30 met the inclusion criteria and agreed to participate. The participants represented 53.57% of the Grade 7 population and underwent the structured Yoga-Zumba exercise program and physical fitness assessments.

2.4 Sample and Sampling Procedure

Purposive sampling was employed to select Grade 7 learners who met the study's inclusion criteria and agreed to participate in the intervention. From the total population of 56 learners, 30 were selected based on their eligibility and willingness to participate. Purposive sampling is a nonprobability technique that allows researchers to select participants with characteristics relevant to the research objectives. Ahmed (2024) emphasized the importance of aligning sampling techniques with the study population, research objectives, and practical considerations. This approach was appropriate for identifying learners targeted by the Yoga-Zumba intervention, although the nonprobability selection limited the generalizability of the findings.

2.5 Research Instrument

The study utilized a demographic data collection template and the Physical Fitness Test (PFT) to gather information on participants' characteristics and physical fitness levels. Demographic information was obtained from learners with assistance from their parents or guardians, while physical fitness assessments were administered by the researcher. The assessments included height and weight measurements for calculating Body Mass Index (BMI), starting and finishing heart rate measurements, push-up performance, basic plank duration, sit-and-reach flexibility, and left-side and right-side zipper test performance. The Department of Education's Revised Physical Fitness Test Manual provided the national policy context for school-based fitness assessment (Department of Education, 2019). The same physical fitness measures were administered before and after the intervention to determine changes in participants' physical fitness components.

2.6 Data Gathering Procedure

Data collection was conducted in three phases: pre-intervention assessment, implementation of the Yoga-Zumba exercise program, and post-intervention assessment. During the pre-intervention phase, the researcher collected baseline demographic information and physical fitness measurements. Demographic data were obtained with assistance from parents or guardians, while the participants' physical fitness levels were assessed through the PFT administered by the researcher. The intervention was implemented over 10 weeks, with three 60-minute sessions conducted weekly every Wednesday, Thursday, and Friday from 4:00 p.m. to 5:00 p.m. at the Grade 7-Hope Classroom after regular class hours. Each session included a 10-minute warm-up, 25-minute Zumba workout, 15-minute yoga session, and 10-minute cool-down. The warm-up consisted of light aerobic and mobility exercises,

including marching, jogging, arm and hip circles, and dynamic stretching. The Zumba component incorporated rhythmic dance movements such as step-touch, side hops, cha-cha, merengue, and freestyle combinations. The yoga component included Tree Pose, Warrior Poses, Triangle Pose, Cat-Cow, Seated Forward Bend, Bridge Pose, and Child's Pose. Each session concluded with stretching and controlled breathing exercises. The intervention incorporated aerobic conditioning, muscle-strengthening movements, and flexibility exercises. Recent research identified exercise type, frequency, duration, and participant characteristics as relevant factors in structured physical fitness interventions for children and adolescents (Pinho et al., 2024). Following completion of the intervention, the researcher administered the same physical fitness assessments used during the baseline evaluation. The pre-intervention and post-intervention data were then compared to examine changes in the participants' physical fitness components.

2.7 Data Analysis Techniques

Descriptive statistics were used to summarize participants' demographic characteristics and physical fitness measurements. Parental income was grouped according to the categories specified in the study: below ₱10,000, ₱10,001-₱15,000, ₱15,001-₱20,000, ₱20,001-₱25,000, and above ₱25,000. These represented the income bands applied in the original data classification. Body Mass Index was calculated using weight in kilograms divided by height in meters squared. The original analysis classified BMI values below 18.5 as underweight, 18.5-24.9 as normal, 25.00-29.9 as overweight, 30.0-39.9 as obese, and above 40 as extremely obese. These were fixed BMI categories rather than age- and sex-specific BMI-for-age categories recommended for growing children and adolescents (Centers for Disease Control and Prevention, 2024). Basic plank performance was categorized as excellent for 51 seconds and above, very good for 46-50 seconds, good for 31-45 seconds, fair for 16-30 seconds, and needing improvement for 1-15 seconds. The original statistical analysis description identified the paired t-test or analysis of variance (ANOVA) as procedures used to compare pre-intervention and post-intervention physical fitness data. Correlation procedures were also reported for examining relationships among study variables. The specific allocation of statistical tests to individual research objectives was not established in the source methodology.

2.8 Ethical Considerations

The study observed ethical principles involving informed consent, confidentiality, and the protection of participants' rights. Approval was obtained from the school administration before conducting the investigation. These procedures were intended to protect the participants during demographic data collection, physical fitness assessment, and implementation of the Yoga-Zumba exercise program.

3. Results and Discussion

3.1 Demographic Characteristics of Grade 7 Learners

3.1.1 Age and Sex Distribution of Participants

The study involved 30 Grade 7 learners aged 11–14 years, with a mean age of 12.17 years. Most participants were 12 years old (60.0%), followed by those aged 11 (16.7%), 13 (13.3%), and 14 (10.0%). Regarding sex, 17 participants (56.7%) were female, while 13 (43.3%) were male. These findings indicated that most participants were 12 years old and that female learners slightly outnumbered male learners. The age distribution placed most participants within early adolescence, a developmental period in which physical growth and maturation influence fitness performance. Pinho et al. (2024) identified chronological age, sex, and body mass index as relevant factors in children's and adolescents' responses to structured physical exercise. Meanwhile, Cagas et al. (2022) emphasized the importance of examining demographic characteristics when assessing physical activity among Filipino children and adolescents. These findings provided context for interpreting the participants' fitness outcomes, although the sample's sex distribution did not establish differences in exercise participation or motivation.

3.1.2 Ethnicity and Parental Income of Participants

The participants represented four ethnolinguistic groups, comprising Ifugao (46.7%), Ilocano (40.0%), Bugkalot (10.0%), and Igorot (3.3%) learners. Regarding monthly parental income, 36.7% belonged to the ₱15,001–₱20,000 category, followed by 30.0% in ₱10,001–₱15,000 and 23.3% in ₱20,001–₱25,000. Meanwhile, 6.7% reported parental income of ₱10,000 or below, while 3.3% reported income above ₱25,000. These findings demonstrated ethnolinguistic diversity and varying socioeconomic backgrounds among the participants. The participants' socioeconomic characteristics were relevant because household resources may influence opportunities for physical activity. Ziegeldorf et al. (2024), in a systematic review, identified associations between socioeconomic indicators and organized physical activity among children, although relationships with overall activity levels were inconsistent. Similarly, Cagas et al. (2022) emphasized the relevance of environmental and contextual conditions in promoting physical activity among Filipino youth. The diversity observed in the present study highlighted the importance of considering learner characteristics when interpreting fitness outcomes without assuming that ethnicity or household income directly determined individual performance.

3.2 Changes in Physical Fitness Following the Yoga-Zumba Intervention

3.2.1 Changes in Height, Weight, and Body Mass Index

The participants' mean height increased from 1.43 m before the intervention to 1.46 m afterward, with a statistically significant mean gain of 0.03 m ($SD = 0.0173$, $t = 11.036$, $p < .001$). Mean weight increased slightly from 40.56 kg to 40.99 kg, but the mean gain of 0.43 kg was not statistically significant ($SD = 2.4581$, $t = 0.98$, $p = .337$). Meanwhile, mean Body Mass Index (BMI) decreased significantly from 19.72 to 19.00, with a mean change of -0.72 ($SD = 1.2992$, $t = 3.04$, $p = .005$). These findings indicated significant changes in height and BMI but not in body weight. The increase in height was consistent with adolescent growth and could not be attributed directly to the intervention. The decline in BMI indicated a reduction in weight relative to height, although the study did not directly measure changes in body fat or lean muscle mass. The Centers for Disease Control and Prevention (2024) emphasized that BMI among children and adolescents should be interpreted using age- and sex-specific percentiles rather than adult classification thresholds. Previous research by Dangan et al. (2024) demonstrated favorable BMI outcomes following a Zumba intervention among overweight and obese Filipino learners. Similarly, Caner and Erdoğan Yüce (2025) reported improvements in BMI and body fat percentage following yoga interventions among children and adolescents with overweight or obesity. These studies supported the potential influence of structured physical activity on anthropometric outcomes, although the present findings did not independently establish body recomposition or a direct causal effect of Yoga-Zumba on BMI.

3.2.2 Changes in Cardiovascular Endurance Indicators

Starting and finishing heart rates increased slightly following the intervention, although neither change was statistically significant. Mean heart rate at the start of assessment increased from 73.10 to 75.07 beats per minute, with a mean gain of 1.97 beats per minute ($SD = 8.3397$, $t = 1.29$, $p = .207$). Similarly, mean heart rate at the finish increased from 148.80 to 154.60 beats per minute, representing a mean gain of 5.80 beats per minute ($SD = 23.6241$, $t = 1.35$, $p = .189$). Neither difference was statistically significant, indicating that the measured heart rate indicators did not demonstrate significant changes following the intervention. The findings differed from research reporting cardiovascular improvements following structured aerobic exercise. Pinho et al. (2024) demonstrated that supervised exercise programs involving aerobic activities could improve cardiorespiratory fitness among children and adolescents. Choudhary and Dubey (2024b) also reported improved cardiovascular fitness following structured Zumba participation among male college students. However, Dangan et al. (2024) documented varying cardiovascular outcomes among Filipino learners participating in a Zumba intervention, including unfavorable aerobic capacity changes despite improvements in some cardiovascular indicators. These findings suggested that cardiovascular responses could vary according to intervention characteristics and assessment methods. The nonsignificant changes in heart rate did not provide sufficient evidence of improved cardiovascular endurance. Furthermore, heart rate measurements alone were insufficient to establish changes in aerobic capacity without a clearly defined and standardized cardiovascular fitness assessment.

3.2.3 Changes in Muscular Strength and Endurance

Muscular performance demonstrated statistically significant improvements following the Yoga-Zumba intervention. The mean number of push-ups increased from 7.67 to 11.47 repetitions, with a mean gain of 3.80 ($SD = 3.3876$, $t = 6.14$, $p < .001$). Basic plank duration also increased significantly from 1.10 to 1.43 minutes, representing a mean gain of 0.33 minutes ($SD = 0.5941$, $t = 3.03$, $p = .005$). These results indicated improvements in upper-body muscular performance and core muscular endurance after the 10-week intervention. The improvements were consistent with research demonstrating the benefits of structured exercise programs for muscular fitness. Pinho et al. (2024) reported that strength-oriented and combined exercise interventions improved muscular strength among children and adolescents. Similarly, Wu et al. (2023) found that school-based exercise modalities, particularly those incorporating muscular training, produced favorable muscular fitness outcomes. Dangan et al. (2024) also documented improvements in muscular strength among Filipino junior high school learners participating in Zumba activities. The observed increases in push-up repetitions and plank duration were consistent with the muscular demands of repeated dance movements and sustained yoga postures. Moreover, Bağkur et al. (2024) reported improvements in selected physical fitness parameters following structured yoga participation among preadolescent children. Collectively, these findings supported the potential contribution of combined movement activities to muscular performance.

3.2.4 Changes in Flexibility Performance

Flexibility measurements improved following the intervention, although statistical significance varied across assessments. Mean sit-and-reach performance increased from 57.33 cm to 63.23 cm, representing a statistically significant mean gain of 5.90 cm ($SD = 6.6662$, $t = 4.85$, $p < .001$). The left-side zipper test also improved significantly from 3.40 to 4.00, with a mean gain of 0.60 ($SD = 0.7701$, $t = 4.27$, $p < .001$). However, the right-side zipper test increased from 4.40 to 4.70, with a mean gain of 0.30 ($SD = 0.9879$, $t = 1.66$, $p = .107$), which was not statistically significant. These findings indicated significant improvements in sit-and-reach performance and left-side shoulder flexibility, but not in right-side shoulder flexibility. The improvements were consistent with the stretching and mobility exercises incorporated into the Yoga-Zumba program. Donti et al. (2022), in a systematic review and meta-analysis, demonstrated that structured stretching improved joint range of motion

among children and adolescents. Similarly, Bağkur et al. (2024) reported favorable flexibility outcomes following a 10-week yoga intervention. The significant improvements in sit-and-reach and left-side zipper test performance were consistent with these findings. However, the difference between left-side and right-side outcomes indicated that flexibility improvements were not uniform across the assessed movements. Such variation could have reflected individual differences in baseline mobility or movement performance, although these potential explanations were not directly examined in the study.

3.3 Differences in Post-Intervention Physical Fitness According to Demographic Characteristics

3.3.1 Differences in Body Composition According to Demographic Profile

Post-intervention anthropometric measurements showed no statistically significant differences in height according to sex ($p = .278$), age ($p = .676$), ethnicity ($p = .958$), or parental income ($p = .806$). Similarly, BMI did not differ significantly according to sex ($p = .354$), age ($p = .149$), ethnicity ($p = .798$), or parental income ($p = .060$). Weight also showed no significant differences according to sex ($p = .231$), age ($p = .208$), or ethnicity ($p = .846$). However, weight differed significantly according to parental-income category ($p = .023$) when evaluated at the .05 significance level. This result did not meet the stricter .01 threshold identified in the study's earlier statistical comparisons. The absence of significant differences in height and BMI across demographic groups indicated that these post-intervention measurements did not vary statistically according to the examined characteristics. However, the significant difference in weight across parental-income categories suggested a possible association between socioeconomic background and anthropometric variation. Ziegeldorf et al. (2024) reported that socioeconomic indicators were associated with selected physical activity behaviors among children, although their findings did not demonstrate uniform relationships across activity measures. Pinho et al. (2024) also identified age, sex, and BMI as relevant considerations in physical fitness development. These findings provided context for the observed demographic comparisons, but the present analysis did not establish that parental income caused differences in body weight or intervention response.

3.3.2 Differences in Cardiovascular, Muscular, and Flexibility Outcomes Across Demographic Groups

Post-intervention cardiovascular measurements showed no statistically significant differences across demographic characteristics. Starting heart rate did not differ significantly by sex ($p = .921$), age ($p = .797$), ethnicity ($p = .799$), or parental income ($p = .245$). Similarly, finishing heart rate showed no significant differences according to sex ($p = .697$), age ($p = .997$), ethnicity ($p = .322$), or parental income ($p = .767$). Muscular performance also showed no significant differences, with push-up p -values of .938, .218, .193, and .428 and plank p -values of .462, .634, .842, and .443 for sex, age, ethnicity, and parental income, respectively. Flexibility outcomes followed the same pattern. The left-side zipper test produced p -values of .771, .608, .311, and .890; the right-side zipper test yielded .130, .618, .803, and .573; and the sit-and-reach test yielded .938, .367, .051, and .155 across the same demographic categories. All these comparisons exceeded the .05 significance threshold. The absence of statistically significant differences suggested that post-intervention cardiovascular, muscular, and flexibility measurements did not demonstrate detectable variation across the examined demographic groups. Nevertheless, these findings did not establish equivalent intervention effects because the reported analyses compared post-intervention measurements rather than directly examining differences in pre-intervention to post-intervention gains across groups. Pinho et al. (2024) emphasized that participant characteristics and exercise prescriptions could influence physical fitness adaptations. Similarly, Wu et al. (2023) demonstrated that different exercise modalities produced varying outcomes across fitness components. These findings supported cautious interpretation of demographic comparisons and highlighted the importance of examining individual characteristics when evaluating structured physical activity interventions.

3.4 Overall Findings and Implications of the Yoga-Zumba Intervention

Following the 10-week Yoga-Zumba exercise program, the study demonstrated a statistically significant decrease in BMI and significant improvements in push-up performance, basic plank duration, left-side zipper test performance, and sit-and-reach flexibility. Height also increased significantly, although this change was consistent with adolescent growth rather than a demonstrated intervention effect. In contrast, weight, starting and finishing heart rates, and right-side zipper test performance did not change significantly. Most post-intervention physical fitness measurements did not differ significantly across demographic groups, except for body weight according to parental income at the .05 significance level. These findings indicated that positive changes were most evident in muscular performance and selected flexibility measures. The findings were consistent with recent evidence supporting structured school-based exercise programs as strategies for improving selected physical fitness components among children and adolescents (Wu et al., 2023; Pinho et al., 2024). Philippine research also demonstrated the potential value of structured Zumba interventions for improving specific fitness outcomes among junior high school learners (Dangan et al., 2024). Nevertheless, Moeller et al. (2024) emphasized that the effectiveness of school-based physical activity interventions varied according to program characteristics and implementation conditions. Within the Philippine context, Palad et al. (2023) highlighted the importance of translating physical activity policies into effective educational practices. The present findings provided school-specific evidence that could inform physical education activities, although the absence of a control group, the

limited sample, and the lack of long-term follow-up restricted conclusions about causality and sustained effectiveness.

4. Conclusion & Recommendations

The study concluded that the 10-week Yoga-Zumba exercise program was associated with significant improvements in selected muscular fitness and flexibility measures among Grade 7 learners at SCALA Integrated School. Statistically significant improvements were observed in push-up performance, basic plank duration, sit-and-reach flexibility, and left-side shoulder flexibility, while BMI decreased significantly. Height also increased significantly, although this change could not be attributed directly to the intervention. Meanwhile, body weight, starting and finishing heart rates, and right-side shoulder flexibility showed no statistically significant changes. Most post-intervention physical fitness measurements did not differ significantly across demographic groups. Although the findings suggested potential benefits for muscular performance and flexibility, the absence of a control group, limited sample size, and lack of long-term follow-up restricted causal interpretation and generalizability. Overall, the results provided preliminary evidence to inform the development and further evaluation of structured school-based physical fitness programs.

School administrators are encouraged to consider integrating Yoga-Zumba exercise programs into physical education activities and providing appropriate facilities, resources, and teacher training. MAPEH teachers should incorporate structured Yoga-Zumba sessions into their instructional practices, participate in relevant professional development activities, and collaborate with school administrators to promote engaging physical fitness programs. Students are encouraged to participate consistently in physical activities, maintain proper nutrition, and adopt healthy lifestyle practices with guidance from teachers and school health coordinators. Future researchers should investigate the long-term effects of Yoga-Zumba interventions, examine their potential contributions to mental well-being and social inclusion, and conduct comparative studies involving other physical activity programs.

The study was limited to 30 purposively selected Grade 7 learners from SCALA Integrated School during the 2025–2026 school year. Its findings were based on physical fitness assessments conducted before and after the Yoga-Zumba intervention within a single educational setting. The absence of a comparison group and long-term follow-up limited conclusions regarding the intervention's causal effects and sustained benefits. Consequently, the findings may not be generalizable to learners from other schools, age groups, or educational contexts.

5. Compliance with Ethical Standards

The study observed ethical principles concerning informed consent, confidentiality, and the protection of participants' rights throughout the research process. These considerations were applied during demographic data collection, physical fitness assessments, and implementation of the Yoga-Zumba exercise program among Grade 7 learners at SCALA Integrated School.

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