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THE EFFECTIVENESS OF THE 2022 STUDENT EXERCISE PROGRAM IN IMPROVING THE PHYSICAL FITNESS OF *PGMI* STUDENTS

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Abstract
This study examined the effectiveness of the 2022 Student Exercise Program in improving the physical fitness of *PGMI* students at *IAIN* Bone. Employing a quantitative pre-experimental design with a one-group pretest-posttest model, a sample of 20 female students was selected from a population of 240 using random sampling. Participants underwent six sessions of rhythmic aerobic exercise. Physical fitness was assessed using a standardized test for ages 16–19, including a 60-meter sprint, pull-ups, sit-ups, vertical jump, and a 1,000-meter run. Data were analyzed using descriptive and inferential statistics. A paired sample t-test revealed a significant improvement in posttest scores ($t = -9.647$; $p = 0.000$), indicating that the program effectively enhanced students' physical fitness. These findings support the integration of structured physical activity into higher education, particularly in teacher training programs.

Keywords: Effectiveness; 2022 Student Exercise Program; Physical Fitness

Introduction

Physical fitness is a vital dimension of student development, closely linked to cognitive function, emotional well-being, and academic success. Defined as the body's ability to carry out daily tasks with vigor and without undue fatigue, physical fitness includes multiple components: cardiovascular endurance, muscular strength and endurance, flexibility, and body composition (Sharkey & Gaskill, 2007; Corbin, Welk, Corbin, & Welk, 2018). These elements are essential for maintaining students' stamina, focus, and resilience, traits that are particularly important for pre-service teachers who must manage both academic and instructional responsibilities (Baumgartner, Jackson, Mahar, & Rowe, 2015).

Regular physical activity has been shown to have a profound impact on brain function. It promotes the release of neurotransmitters that improve mood, memory, and attention (Ratey, 2008). Gibson, Wagner, and Heyward (2024) note that aerobic activity increases oxygen and glucose delivery to the brain, enhancing mental alertness and cognitive capacity. In alignment, Donnelly and Lambourne (2011) emphasize that structured exercise can improve executive function and academic performance, especially in younger populations. Though most studies focus on school-aged children, similar benefits are applicable to university students, including those in teacher education programs.

In teacher education, physical fitness plays a dual role: it strengthens the personal health of future educators and prepares them to model healthy, active lifestyles in their classrooms. Pangrazi and Beighle (2019) argue that pre-service teachers should not only understand the pedagogical aspects

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

of physical education but also embody its principles. Siedentop, van der Mars, and Hastie (2020) add that fitness-oriented programs enhance social skills, self-discipline, and teamwork, core qualities in effective teaching.

Despite this, Islamic higher education institutions often prioritize theoretical and religious knowledge, leaving physical development largely unaddressed. This imbalance can result in sedentary habits, decreased endurance, and low student engagement in wellness practices (Greenberg, Dintiman, & Oakes, 2016). Fahey, Insel, and Roth (2019) explain that inactivity among university students is linked to increased stress, poor posture, and reduced metabolic efficiency, all of which may undermine learning and performance.

Furthermore, physical education is often excluded from the formal curriculum in teacher training programs, especially in non-sport faculties such as *PGMI*. This exclusion neglects the importance of holistic education, which integrates intellectual, spiritual, emotional, and physical domains. Haskell, Blair, and Hill (2009) emphasize that physical activity must be positioned not as a supplementary or recreational practice but as an essential component of educational policy and personal growth. In Islamic education settings, where moral and spiritual integrity are emphasized, the inclusion of physical discipline can serve as an embodiment of the prophetic tradition of caring for one's physical well-being alongside faith and knowledge.

Research has also confirmed that rhythmic aerobic exercises, such as group-based student fitness programs, improve not only physical fitness but also motivation, cooperation, and social cohesion among students (Soraya, Sugihartono, & Defliyanto, 2019). This is especially relevant for *PGMI* students who will later teach young learners, where energy, mobility, and the ability to model healthy behavior are essential. Physical fitness is not merely a personal asset but a professional requirement in pedagogical practice.

Preliminary observations at *IAIN* Bone have indicated that many *PGMI* students experience early fatigue, low muscle endurance, and lack of exercise habits. The lack of structured physical activity in their academic life contributes to this physical decline. Without intervention, these future teachers risk entering schools unprepared to physically meet the demands of the profession or to instill active lifestyles in their pupils. Addressing this issue through targeted, context-sensitive programs is both timely and necessary.

This study seeks to evaluate the effectiveness of the 2022 Student Exercise Program in improving the physical fitness of *PGMI* students at *IAIN* Bone. The program consists of rhythmic aerobic training tailored to non-sport students. The research contributes not only empirical evidence regarding its impact but also theoretical insight into how structured physical fitness can support academic and pedagogical readiness in Islamic higher education (Haskell, Blair, & Hill, 2009). The study advocates for the integration of health-focused practices within teacher preparation programs to promote holistic education.

Literature Review

Physical fitness: concept and components

Physical fitness is defined as the ability of an individual to perform daily activities with vigor and without undue fatigue, while still having energy left for leisure and emergency situations (Sharkey & Gaskill, 2007). It is a multi-dimensional construct comprising both health-related components, such as cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

composition, and skill-related components including agility, balance, coordination, power, reaction time, and speed (Baumgartner et al., 2015). These elements contribute not only to physical health but also to mental sharpness and resilience, particularly relevant for students balancing academic and social responsibilities.

Gibson et al. (2024) emphasize that optimal levels of physical fitness support psychological well-being, motivation, and the ability to focus during extended periods of learning. In line with this, Sepriadi et al. (2017) found that students with moderate to high fitness levels demonstrated better emotional regulation and academic persistence compared to their less active peers.

Physical exercise and its academic benefits

Engaging in structured physical exercise is one of the most effective ways to enhance all aspects of physical fitness. According to Pangrazi and Beighle (2019), regular physical activity strengthens the cardiovascular system, increases muscular efficiency, and improves body composition. These physiological improvements directly influence academic performance by increasing students' energy levels, reducing stress, and enhancing mental clarity. Baumgartner et al. (2015) further stress that when physical activity is incorporated systematically into students' routines, it supports not only their health but also their readiness to learn.

In the context of teacher education, where curriculum demands are often intense and sedentary, the inclusion of exercise is even more crucial. A study by Dewi and Rifki (2020) on senior high school students showed that aerobic exercise routines significantly enhanced participants' stamina and focus in class. While this research was conducted at the secondary level, the implications are equally relevant to university students whose physical activity is often neglected due to academic pressures.

Rhythmic exercise as an educational fitness tool

Rhythmic exercise, a type of aerobic movement synchronized with music, has been widely used as a form of enjoyable yet effective physical training. According to Pasaribu and Mashuri (2019), rhythmic exercise improves cardiovascular health, flexibility, coordination, and emotional engagement. When performed consistently, it offers dual benefits, enhancing physical capacity and fostering emotional expression.

In education, rhythmic movement also contributes to classroom engagement and motivation. Cenza et al. (2023) found that students who participated in rhythmic aerobic sessions demonstrated not only physical improvement but also increased classroom attentiveness and emotional well-being. These findings suggest that rhythmic exercise can be an ideal fit for teacher education programs that aim to promote holistic student development.

Physical education in higher education contexts

Although physical education is mandated at elementary and secondary levels, its presence in higher education is often minimal. This is particularly true in religious and teacher education institutions where curricular focus leans heavily toward academic content. Gibson et al. (2024) argue that neglecting physical development at the tertiary level leads to a mismatch between students' cognitive growth and physical competence, which can negatively affect their future roles as educators.

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

Islamic higher education institutions face a unique challenge in integrating physical education due to cultural, curricular, and logistical factors. However, as Pangrazi and Beighle (2019) assert, future teachers must embody healthy habits if they are to effectively model them for their students. Ramadhan and Priyono (2022) support this view, noting that physical fitness programs are most successful when implemented early in the educational pipeline, including in pre-service teacher training.

This research responds to that call by examining the physical fitness levels of PGMI students at *IAIN* Bone, offering evidence-based support for the integration of structured physical activity, specifically rhythmic exercise, into the tertiary education curriculum. Through this initiative, institutions can foster not only academic excellence but also the physical and emotional preparedness of future educators.

Methodology

Research design and approach of the study

This study employed a quantitative research method with a pre-experimental design, aimed at measuring the effectiveness of an intervention by observing changes in numerical data. Quantitative research, according to Creswell and Creswell (2017), is characterized by the use of structured instruments, statistical analysis, and objective measurement of variables. It seeks to test hypotheses and examine relationships between variables using a deductive approach. The one-group pretest-post-test design used in this study is a form of pre-experimental design that allows for initial assessment of an intervention's impact. In this model, a single group of participants is observed before and after the treatment. Although this design lacks a control group and is more vulnerable to threats to internal validity, it is particularly useful for classroom-based interventions and pilot studies conducted in naturalistic educational settings (Baumgartner et al., 2015). This research design was selected due to its practicality and suitability in measuring the direct impact of the 2022 Student Exercise Program on the physical fitness of *PGMI* students.

The intervention's goal was to assess whether systematic physical training over a short period could produce significant measurable improvements in student fitness outcomes. The study thus aligns with experimental logic, where any difference observed between pretest and post-test scores is attributed to the treatment administered during the study period.

Research site and participants

The research was conducted in the *Pendidikan Guru Madrasah Ibtidaiyah (PGMI)* Study Program at *Institut Agama Islam Negeri (IAIN*) Bone, South Sulawesi. This institution was selected because it offers a formal Islamic teacher education program and represents a context where physical education is often under-emphasized. The total population consisted of 240 active *PGMI* students in the 2022 academic year.

To ensure representativeness and reduce selection bias, the sampling technique used was simple random sampling. This technique, as defined by Sahir (2022), involves selecting participants in such a way that each member of the population has an equal chance of being included. A random draw using student ID numbers was used to select 20 female students as the study sample. The decision to include only female students was based on two methodological and contextual considerations:

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

- Gender-specific fitness assessments: Male and female participants are subject to different standards in physical testing, which could introduce variability in score interpretation.
- Population ratio: Over 90% of *PGMI* students are female, making the female sample more representative of the actual program demographics.

This approach ensures consistency in data collection, eliminates confounding variables related to gender differences in performance, and enhances the internal validity of the study. This study examined two core variables:

- Independent Variable: The 2022 Student Exercise Program (*Senam Pelajar 2022*), a rhythmic aerobic training program designed to improve student physical fitness through structured, repetitive movement synchronized with music.
- Dependent Variable: Physical fitness levels of students, as measured by national physical fitness standards for adolescents.

The relationship tested was whether participation in the exercise program produced a statistically significant improvement in measured physical fitness outcomes.

Data collection and analysis

The data collection process involved both observation and testing, centered on a standardized Indonesian Physical Fitness Test (*Tes Kebugaran Jasmani Indonesia*) developed for high school students aged 16–19, as documented by Sepdanius et al. (2019). The pretest and post-test consisted of the following five physical components:

- 60-meter sprint: to assess speed and explosiveness.
- Pull-ups (30 seconds): to evaluate upper-body strength (modified for females).
- Sit-ups (60 seconds): to measure abdominal muscular endurance.
- Vertical jump: to assess leg muscle power.
- 1000-meter run: to measure cardiovascular endurance.

Each test component was scored using normative benchmarks based on the participant's age and gender. These scores were then aggregated into a composite fitness score per student for pretest and post-test comparison. All instruments had been previously validated for adolescent populations and are commonly used in Indonesian educational settings. All testing procedures were conducted by trained physical education staff using standardized protocols to minimize measurement bias and ensure reliability. The 2022 Student Exercise Program was implemented in six sessions over two weeks, with each session lasting approximately 40–50 minutes. Each session consisted of three core phases.

Warm-up phase (10 minutes), this phase involved light jogging, stretching, and joint mobility exercises to prepare the muscles and cardiovascular system. According to Minihane et al. (2015), a proper warm-up increases blood flow, raises muscle temperature, and reduces injury risk.

Core exercise phase (20–30 minutes), participants engaged in rhythmic aerobic routines performed to music. These routines included coordinated arm-leg movements, aerobic dance patterns, and moderate-impact steps, designed to elevate heart rate and stimulate muscular engagement. The rhythm and movement structure were adapted from *Senam Kesegaran Jasmani* 2022 modules and aligned with Cenza et al. (2023), who highlight the benefits of rhythmic movement in improving endurance and motivation.

Cool-down phase (5–10 minutes), this segment involved static stretching and controlled breathing

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

to gradually return the body to a resting state and reduce post-exercise muscle soreness (Irkham et al., 2024). Each session was supervised by a physical education instructor. Attendance was recorded, and observations on student engagement were noted to ensure program fidelity.

Data analysis involved both descriptive and inferential statistics, conducted using SPSS software as follows. *Descriptive analysis*, calculating the mean, median, standard deviation, minimum, and maximum of pretest and posttest scores to describe the general trend and distribution of student performance (Gravetter & Wallnau, 2014). *Normality test*, the Kolmogorov–Smirnov test was used to determine whether the score distributions conformed to a normal curve. A significance value above 0.05 indicated normally distributed data (Ghasemi & Zahediasl, 2012). *Homogeneity test*, Levene's Test was applied to determine whether the variances between the pretest and post-test scores were statistically equal. Homogeneity is a precondition for t-test validity. *Paired sample t-test*, to evaluate the significance of the difference between pretest and post-test mean scores, a paired sample t-test was conducted. This test determines whether the observed changes are statistically meaningful (Creswell & Creswell, 2017). A p-value < 0.05 was set as the threshold for rejecting the null hypothesis.

Results

The main objective of this study was to assess the effectiveness of the 2022 Student Exercise Program in improving the physical fitness levels of *PGMI* students at IAIN Bone. To determine this, participants' fitness levels were measured before and after the intervention using standardized physical tests. The following results summarize the findings based on descriptive and inferential analyses.

Descriptive analysis of physical fitness scores

The descriptive statistics show notable differences in students' physical fitness levels before and after the implementation of the exercise program.

Table 1. *Summary of pretest and post-test scores*

Statistics	Pretest	Posttest
Mean	15.42	17.85
Median	13.50	15.50
Minimum Score	8	9
Maximum Score	20	23
Standard Deviation	3.243	3.416
Sample Size (N)	20	20

It showed that the mean score increased by 2.43 points, indicating a general improvement in students' overall physical fitness following the intervention. The median also increased, and both minimum and maximum scores shifted upward, reflecting better performance across the sample. The slightly higher standard deviation in the post-test suggests more variation in individual gains, likely due to differences in fitness adaptation or effort.

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

Inferential analysis – paired sample t-test

To statistically test whether the observed improvement was significant, a paired sample t-test was conducted comparing pretest and post-test results.

Table 2. *Paired sample t-test results*

Pair	Mean Difference	t-value	df	Sig. (2-tailed)
Pretest – Post-test	-2.350	-9.647	19	0.000

The t-test produced a t-value of -9.647 with a p-value of 0.000. Since this p-value is significantly below the threshold of 0.05, the difference between pretest and post-test scores is statistically significant. This means that the null hypothesis (which states that there is no significant difference before and after the intervention) is rejected, while the alternative hypothesis is accepted. The results demonstrated that the 2022 Student Exercise Program was effective in improving students' physical fitness. Effective in this context refers to both a statistical and practical improvement:

- Statistically, the significant t-value and low p-value confirm that the improvement was not due to chance.
- Practically, the increase in mean and median fitness scores shows that participants experienced measurable benefits in key areas such as cardiovascular endurance, muscular strength, and body coordination.

These findings validated the use of structured rhythmic aerobic training as a feasible and impactful intervention for promoting physical fitness, especially in academic settings where students are often sedentary. Moreover, the results reflect that even within a relatively short period (six sessions), meaningful improvements can be achieved, supporting earlier claims by Cenza et al. (2023) and Ramadhan and Priyono (2022) regarding the efficiency of rhythmic fitness programs.

Discussion

The results of this study confirm that the 2022 Student Exercise Program significantly improved the physical fitness of *PGMI* students at IAIN Bone. The statistically significant increase in mean post-test scores (from 15.42 to 17.85) and the strong t-value of -9.647 indicated that the program had a real and measurable impact on the participants. This supports the conclusion that the program was effective, both in a quantitative sense (test scores improved significantly) and in a practical sense (students showed greater endurance, strength, and physical resilience).

Effectiveness refers to the ability of the intervention to achieve its intended outcomes, namely, an enhancement in participants' physical fitness levels as measured through standardized testing. It also implied that the method of delivery (structured, rhythmic, and music-based exercises) was appropriate and engaging for the student demographic involved. This aligns with the definition of an effective educational intervention as one that not only produces statistically significant outcomes but also meets the practical needs of learners (Pangrazi & Beighle, 2019; Baumgartner et al., 2015). The findings are consistent with those of Ramadhan and Priyono (2022), who found that rhythmic physical training programs significantly improved physical endurance and cardiovascular fitness in elementary school students. Similarly, Dewi and Rifki (2020) reported that aerobic training increased both the physical performance and motivational levels of high school students. The present study expands on

those findings by showing that similar improvements are achievable at the tertiary level, particularly among students in teacher education programs where physical activity is often neglected.

Importantly, this research contributes context-specific insights by situating the intervention in an Islamic higher education setting. In such environments, curriculum structures are typically dominated by religious and academic theory, with limited space for physical education. However, this study demonstrated that even within these constraints, a simple and time-efficient program like the 2022 Student Exercise Program could produce significant outcomes. The rhythmic nature of the program, with music and coordinated movements, also appeared to be highly suitable for female students, who represented the majority of participants in this context. The observed improvements suggested that structured exercise could counteract the negative effects of academic fatigue, sedentary study habits, and low physical engagement, issues that were noted during preliminary observations of *PGMI* students. Gibson et al. (2024) assert that when students regularly engage in physical activity, they exhibit improved mental clarity, greater resilience to stress, and a stronger ability to focus, traits essential for success in teacher training. Furthermore, the pedagogical implications of these findings are significant. As future educators, *PGMI* students who adopt and experience the benefits of regular physical exercise are more likely to promote health-oriented values and active learning environments in their future classrooms. This supports the call by Pangrazi and Beighle (2019) for early professional modelling of healthy behavior during teacher training.

In sum, the results demonstrated that the integration of short, structured physical activity sessions into university programs is not only feasible but also necessary, especially for institutions seeking to promote holistic student development. The findings provided empirical support for embedding similar programs in other faculties, especially in Islamic universities where physical education is not yet formally prioritized.

Conclusion and Recommendations/Implications

Based on the findings of this study, it can be concluded that the 2022 Student Exercise Program was effective in enhancing the physical fitness levels of *PGMI* students at *IAIN* Bone. The term effective in this context refers to both the statistically significant improvement in students' post-test scores ($t = -9.647$; $p < 0.05$) and the observable increase in physical capability, including cardiovascular endurance, muscular strength, and flexibility. This effectiveness is demonstrated not only by the quantitative data but also by the practical relevance of the program's structure, its rhythmic and engaging nature, time efficiency, and alignment with student needs. The program was especially impactful considering the academic demands and sedentary routines that typically characterize teacher education settings. These findings underscore the importance of integrating structured physical activity into higher education curricula, especially within Islamic institutions where such initiatives are often lacking. The study contributes to the growing body of evidence supporting the role of physical education as a core component of academic success, particularly in pre-service teacher training programs. By improving physical fitness, such programs also support cognitive stamina, emotional resilience, and overall student well-being, attributes essential for future educators.

Based on the findings and conclusions of this study, several recommendations are proposed to enhance the role of physical fitness in Islamic higher education. First, teacher education programs such as *PGMI,* are encouraged to integrate structured physical activity, particularly rhythmic aerobic exercises, into both curricular and extracurricular activities to foster holistic student development. Second, physical education instructors should develop fitness programs that are gender-responsive,

ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

time-efficient, and engaging, especially in faculties not focused on sports science. Rhythmic exercises are recommended due to their motivational and aesthetic appeal. Third, institutional leaders should provide policy support by allocating facilities, time, and trained personnel to ensure consistent program implementation, thereby reinforcing the importance of physical wellness in academic achievement. Finally, future research should include male participants or conduct gender comparisons, employ longer intervention periods, use control group designs for stronger internal validity, and incorporate qualitative approaches to capture students' experiences and motivation. These efforts will contribute to a more inclusive and health-oriented academic environment in Islamic teacher education settings.

Disclosure statement

No potential conflict of interest was reported by the authors.

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ISSN |2355-3669| E-ISSN |2503-2518|
Volume 12 | Number 2 | December 2025|

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