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Physical Fitness Assessment of First-Year Students for Evidence-based Revision on the Movement Competency Training Syllabus

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Index Terms:

Physical fitness, Evidence-based, Movement Competency, syllabus

Abstract. Physical fitness is a determinant for health, wellness, and academic achievement in first-year students as they move from the comparatively active environment of high school to the more sedentary environment of college. The research conducted in this study focused on comparing first-year students' physical fitness concerning health-related fitness and skill-related fitness to analyze how scores on fitness tests differ according to demographic factors such as age, gender, or body type. Using the descriptive-comparative research design, researcher conducted the study among first-year students taking the PATHFit Movement Competency Training course during 2025–2026 in three different schools across the university. Out of 321 eligible students, 228 were selected using stratified random sampling and took part in the research by undergoing a battery of tests measuring their muscular strength, muscular endurance, cardiovascular endurance, flexibility, agility, and power. The analysis of data was conducted using descriptive statistics and analysis of variance (ANOVA) methods to detect differences in fitness scores between different demographic groups. The results of the research indicated that there are substantial differences in fitness scores by age, gender, and body type. Young students outperformed the elderly ones on muscular endurance, cardiovascular endurance, and flexibility tests, while women performed better on the flexibility test. Mesomorphic individuals had greater muscular strength and endurance than individuals with other body types. The findings of the study suggest that physical education programs adapted to first-year students' specific needs should be developed, as they have an important implication for the improvement of the curriculum of the Movement Competency Training course. The authors also emphasize the necessity for incorporating these differences into the process of fitness programs development.

Introduction

Physical fitness is a critical component of health and well-being, particularly among adolescents navigating significant physical changes and forming lifelong habits. For college students, staying physically active is essential to adapting to academic demands and social change; research links active students to better academic performance, stress management, and self-confidence. In the Philippine educational system, physical education has long been considered central to student development. However, as higher education demands grow more complex and students' living conditions and habits shift, the need for evidence-based programs tailored to how students actually live has become more apparent, since most enter college with physical habits already formed in earlier years.

This need to understand students through objective, data-driven insight motivates the present study. First-year students are of particular value as an unexplored population, given their transition from an active high school lifestyle to a comparatively sedentary college one. Yet despite the acknowledged importance of fitness and movement competency, the literature lacks baseline demographic and fitness profile data for this group; most prior research instead focuses on athletes or clinical populations (Santiago & Ibarra, 2023). Without such baseline data, colleges cannot design curricula suited to students' actual abilities and needs, monitor progress, identify areas requiring intervention, or implement instruction aligned with Outcomes-Based Education and inclusive pedagogy (Dimarucot et al., 2024).

This need for a more scientific approach to physical education led the Commission on Higher Education (CHED) to issue Memorandum Order No. 39, series of 2021, establishing policies and guidelines for the Physical Activity Towards Health and Fitness (PATHFit) program (Pocaan, 2024). PATHFit aims to build a culture of physical fitness among university students, equipping them with sports and fitness education and lifelong habits of physical activity. At the core of PATHFit is movement competency: the ability to perform basic movement patterns efficiently and correctly. More than an assessed skill, movement competency shapes how students engage with physical activity, with greater competency associated with fuller participation and reduced injury risk, underscoring the need for instructors to understand students' movement competency in order to calibrate appropriate challenges.

To address this gap, the present study profiles first-year students' physical fitness based on demographic, health-related, and skill-related characteristics, informing further improvement of the Movement Competency Training course under PATHFit. As a population largely overlooked in prior research, first-year students stand to benefit directly from evidence-based, tailored fitness programming. The study pursues three objectives: (1) to inform instructors' teaching processes with data on students' fitness conditions; (2) to support the implementation of Outcomes-Based Education and inclusive pedagogy tailored to student needs; and (3) to establish a basis for future evaluation of the PATHFit program and its Movement Competency Training component.

Review of Related Literature and Studies

Physical fitness and proficiency in physical activity significantly affect well-being and functional capacity throughout life, particularly during the transition from high school to college, when students face increased academic demands, reduced exercise, and lifestyle changes that can adversely affect health and physical ability. As these effects vary across demographic groups, this review examines fitness through a demographic lens. Santiago and Ibarra (2020) found that Filipino college students show average fitness performance regardless of age, suggesting age plays a limited role in physical ability, while sex appears more influential. Pituk and Cagas (2019) found that male participants outperformed females on vertical jump, curl-up, and running tests, while females performed better on lower-body flexibility and had higher body fat. Pérez et al. (2021) attribute such differences to males' generally greater body mass and lean muscle mass, though Rai et al. (2015) found the opposite pattern for cardiovascular endurance, with females outperforming males.

These demographic trends extend to health-related fitness more broadly. Muscular strength and endurance are critical to injury prevention, joint stability, and posture (American College of Sports Medicine [ACSM], 2013), while flexibility, built through stretching, supports both joint mobility and overall muscular health, including power and strength (Bouguezzi et al., 2023). Body composition is similarly central to health-related fitness, influencing nearly all other fitness dimensions.
This pattern holds among first-year Filipino college students specifically. Santiago and Ibarra (2023) found that first-year students show good cardiovascular endurance and flexibility but poor muscular strength and body composition, echoing Rai et al. (2015), who linked sedentary lifestyles among college students to lower cardiovascular endurance. Overall, physical activity level appears to be a stronger predictor of health-related fitness than age or sex. Agility research points to a cognitive dimension beyond mere speed. McFarland et al. (2016) examined the relationship between agility and power, though their reported finding on sex differences is unclear and requires verification before citing.

Movement quality also directly affects injury risk. Liu et al. (2023) found that lower functional movement screening scores correspond to higher injury likelihood during sports participation, and Koźlenia and Domaradzki (2021) similarly found that limited flexibility combined with poor movement quality increases injury risk both in sports and daily life. These findings raise questions about the effectiveness of current fitness programs. Through Memorandum Order No. 39, series of 2021, the Commission on Higher Education (2021) implemented PATHFit to address gaps in student fitness, though whether this goal has been met remains unresolved. Dimarucot et al. (2024) reviewed an extended exercise program for Philippine college students and reported improvements in bodily and muscular endurance, suggesting such programs should emphasize measurable intervention impact; however, concerns remain about young people's compliance with physical activity recommendations. Dispo (2025) further notes that effective implementation is critical to achieving positive outcomes.

Overall, this body of research suggests that sex has a more significant effect on fitness levels than age, and that physical activity patterns correlate strongly with body composition and lifestyle. It further underscores that fitness training and injury prevention are equally important components of student athletic development.

Theoretical Framework

The study employs multidisciplinary approaches in physical fitness, human growth, inclusive education, and course creation in order to study the problems of physical fitness among first-year students and to help with the development of the Evidence-Based Movement Competency Training Course. There are two theoretical framings of the study, namely Self-Determination Theory (Deci & Ryan) and Outcomes-Based Education (Spady). Self-Determination Theory purports that the degree of involvement of an individual in some activity is influenced by the level of autonomy, competence, and relations with other people. To physical education, which implies the idea that students will be motivated to participate in physical activities if they feel competent and have some level of autonomy in the way they learn. Therefore, involving students in physical education courses does not only require equipping students with the respective skills, but it also involves providing both support and the course of choices during the learning process. As Deci & Ryan (1985) say, providing the students with autonomy and competence is essential for making success in creating the habits. Outcomes-based education, in its turn, is a framework that helps develop programs according to the needs of a certain group of students and makes it clear what kind of knowledge and skills the students will gain at the end of the course.

Conceptual Framework

This research aims to examine the demographic characteristics (age, gender, body composition) and physical fitness characteristics (health-related and skill-related fitness) of first-year university students. Its findings rest on the statistical analysis of data gathered from the study's subjects. Ultimately, the research seeks to generate information that can support the evaluation and enhancement of the Movement Competency Training syllabus under the PATHFit program.

To organize the study logically, the researcher adopted the Input-Process-Output model as its conceptual framework, illustrated in Figure 1.1. This model was selected for its ability to clearly map how the study's components connect — from the initial gathering of data through to the final outcomes. On the input side, the framework incorporates first-year students' demographic characteristics (age, gender, and body composition) along with health-related fitness indicators such as muscular strength, muscular endurance, cardiovascular endurance, and flexibility. These variables were selected because they represent the defining characteristics of the population under study. The process stage unfolds in two phases. First, fitness tests are administered to assess each fitness parameter for every student. Second, the resulting data is analyzed using descriptive statistics to build fitness profiles of the subjects, while inferential statistics are used to determine whether differences in fitness levels across demographic factors are statistically significant. The output stage then draws on these fitness profiles and statistical findings to formulate recommendations for refining and adapting the Movement Competency Training syllabus to better meet students' needs.

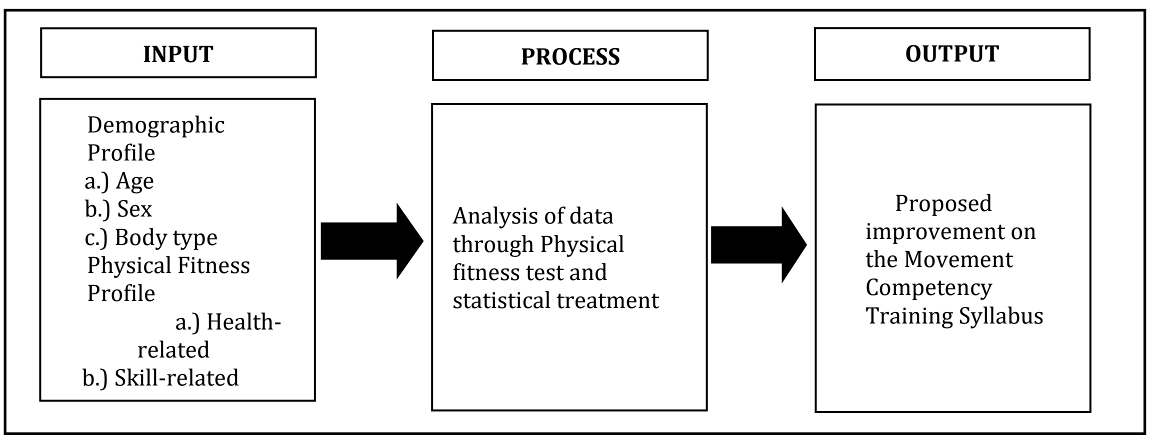

Figure No. 1. Paradigm of the study

Research Questions

The researcher aimed to determine the physical fitness profile of first-year college students at a local college in the province of Quezon for the academic year 2025-2026 as a basis for the syllabi improvements on movement competency training, ensuring it is evidence-based and tailored to the specific requirements of incoming college students.

Specifically, this study sought to answer the following questions:
1. What is the demographic profile of first-year college students in terms of:
   1.1 age,
   1.2 sex, and
   1.3 body type?
2. What is the physical fitness profile of first-year college students in terms of:

2.1 health-related:
a. Muscular strength,
b. Muscular endurance,
c. Cardio-vascular endurance, and
d. Flexibility?
2.2 skill-related:
a. Agility; and
b. Power?
3. Is there a significant difference in the students' physical fitness levels when grouped according to their demographic characteristics (age, sex, and body type and physical fitness of the first-year college students)?
4. What strengths, weaknesses, and developmental needs can be identified from the physical fitness profiles of the first-year college students?
5. How can the findings from the physical fitness profiling be used to recommend improvements to the Movement competency training syllabus under PATHFit?

Assumptions of the Study

There is no significant difference between the demographic profile and physical fitness of the first-year college students.

Methodology

Design

This study employed a descriptive-comparative research design, a type of non-experimental design that allows researchers to measure specific variables and identify differences in those variables across groups (Polit & Beck, 2022). This design was chosen because it supports systematic investigation of differences among groups (Cantrell, 2011). Since the demographic factors in this study — age, gender, and body type — also function as the independent variables, the descriptive component was used to accurately characterize first-year college students' health-related and skill-related fitness levels (Creswell & Creswell, 2018), while the comparative component relied on inferential statistics, specifically analysis of variance (ANOVA), to examine differences in fitness scores across students' demographic profiles (Polit & Beck, 2022). The findings from this statistical analysis are intended to inform potential revisions or improvements to the Movement Competency Training syllabus within the PATHFit program.

The study was conducted at a college in the Quezon region that offers several undergraduate programs and adheres to Commission on Higher Education (CHED) requirements, including implementation of the Physical Activity Towards Health and Fitness (PATHFit) program under CMO No. 39, Series of 2021. This makes the institution a fitting setting for examining how the program's Movement Competency Training component functions among incoming students. The respondents were first-year students enrolled in the PATHFit Movement Competency Training course during the 2025–2026 academic year, drawn from three schools within the institution: the School of Teacher Education, the School of Information Technology, and the School of Business Management Education. Of the 321 first-year students enrolled across these schools, 228 students under the PATHFit program took part in the study, forming the final sample.

To ensure the sample represented the broader first-year student population, the study used stratified random sampling, giving all first-year students an equal chance of being selected. As Acharya et al. (2013) explain, stratification improves comparisons between groups by ensuring subpopulations are properly represented in the sample, a principle applied here to strengthen the reliability and validity of the subsequent analysis. Data collection relied on a standardized fitness evaluation instrument developed by Fukuda (2019), which captured both demographic information and health- and skill-related fitness measures. The instrument was administered in two stages: the first gathered participants' age, gender, and body type, while the second assessed physical fitness through a series of tests — the half-squat test, step test, push-up test, back-scratch test, hexagon agility test, and vertical jump test — selected for their established validity in comparable research contexts.

Results and Discussion

This sections presents the results and analysis of the study concerning the physical fitness profiles of first-year students across various components of physical fitness. Data are organized around the study's research questions, beginning with the demographic and physical fitness profiles of respondents, followed by tests of significant differences in fitness levels across demographic groups, and concluding with a synthesis of key strengths and developmental gaps. The sections aims to offer a clearer understanding of students' current physical fitness levels, which may serve as a basis for developing appropriate interventions, enhancing physical education programs, and improving curriculum planning in higher education institutions.

Two decision rules apply consistently throughout this chapter. First, for the normality tests presented in Table 3, a p-value greater than the 0.05 level of significance indicates that the data do not significantly deviate from a normal distribution, and normality is therefore assumed — a necessary condition for the parametric statistical procedures (ANOVA) used in subsequent analyses. Second, for all hypothesis tests that follow, a p-value less than or equal to 0.05 leads to rejection of the null hypothesis (H_o), indicating a statistically significant difference between groups, while a p-value greater than 0.05 results in failure to reject H_o, indicating no significant difference. These rules are applied uniformly across Tables 4 to 33.

Demographic Characteristic	Category	Count, n	Percentage (%)
Age	Young Adulthood (17-25 years old)	198	87
	Early Adulthood (26-35 years old)	20	9
	Middle Adulthood (36+ years old)	10	4
	Total	228	100%
Sex	Female	110	48
	Male	118	52
	Total	228	100%
Body Type	Ectomorph	119	52.2
	Mesomorph	42	18.4
	Endomorph	67	29.4
	Total	228	100%

Table No. 1. Demographic Profile of the Respondents

Table 1 presents the demographic profile of the 228 respondents. The majority (87%, count - n = 198) fell within the Young Adulthood category (17–25 years), consistent with typical higher education enrollment patterns globally and in the Philippines (Education Data Initiative, 2025; National Center for Education Statistics, 2024; Santos & Tan, 2023). The sample also reflected a slight male majority (52%, count - n = 118 vs. 48%, count - n = 110), mirroring national enrollment trends in Philippine higher education, where males have historically outnumbered females, though this gap has narrowed over time (San Buenaventura, 2019; World Economic Forum, 2020; Philippine Statistics Authority, 2021). In terms of body composition, ectomorphic types were most prevalent (52.2%, count - n = 119), followed by endomorphic (29.4%, count - n = 67) and mesomorphic (18.4%, count - n = 42) classifications. This distribution is attributed to the physically active lifestyles common among Filipino young adults, particularly through commuting and daily movement (Antos et al., 2025; Palma et al., 2024; Santos & Tan, 2023). This contrasts with trends observed among Western college students, who have shown a shift toward endomorphic-mesomorphic profiles linked to more sedentary lifestyles and reduced incidental physical activity (Frontiers in Physiology, 2025).

Physical Fitness	Test	Mean	Verbal Interpretation
Health-related			
Muscular Strength	Half -Squat	99.49s	Typical
Muscular Endurance	Push-up	18.62 repetitions	Low
Cardio-vascular Endurance	Submaximal Step	129.11bpm	High
Flexibility	Back-Scratch	5.28cm	High
Skill – related			
Agility	Hexagon Agility	14.81	Low
Power	Vertical Jump	35.31cm	Low

Note: Scores for the Health-Related Fitness Test: for Muscular Endurance (Half Squat), 130 and above (High), 70–129 (Typical), and 69 and below (Low); for Muscular Endurance (Push-Up), 45 and above (High), 25–44 (Typical), and 24 and below (Low); for Cardiovascular Endurance (Submaximal Step Test), below 144 (High), 145–167 (Typical), and 168 and above (Low); for Flexibility (Back-Scratch Test), above (High), -3 to 4 (Typical), and below -4 (Low). Scores for the Skill-Related Fitness Test: for Agility (Hexagon Agility Test), below 11.7 (High), 11.8–13.9 (Typical), and 14.0 and above (Low); for Power (Vertical Jump Test), above 61 (High), 54–60 (Typical), and 53 and below (Low).

Table No. 2 Physical Fitness Profile of First-Year College Students

Table 2 presents the fitness profile of freshman respondents across health- and skill-related components. Respondents demonstrated high ratings in cardiovascular endurance (Mean = 129.11 BPM, Submaximal Step Test) and flexibility (Mean = 5.28 cm, Back Scratch Test), alongside a typical rating in lower-body strength (Mean = 99.49 seconds, Half-Squat Test). However, muscular endurance was notably low (Mean = 18.62 repetitions, Push-Up Test), indicating an imbalance between lower- and upper-body fitness. This pattern is consistent with findings among Filipino college students, who tend to perform well on cardiovascular measures—largely attributed to physically demanding daily commuting—but show persistent deficits in upper-body strength and endurance due to limited engagement in structured resistance training and increasingly sedentary lifestyles (Santiago & Ibarra, 2023; López & Garcia, 2021; Pituk & Cagas, 2019). With respect to skill-related fitness, respondents scored poorly on both agility (Mean = 14.81 seconds, Hexagon Agility Test) and explosive power (Mean = 35.31 cm, Vertical Jump Test). These results suggest limited capacity for rapid directional change, balance, and forceful muscular output. Santiago (2024) attributes this to the repetitive, linear nature of active commuting, which offers minimal fast-twitch fiber activation compared to high-intensity, explosive training (Steele, 2024). This deficit is further compounded by a broader shift away from active outdoor play toward sedentary, digital lifestyles among today's youth, which has reduced opportunities to develop coordination, agility, and neuromuscular control (Vargas et al., 2025; Ardison, 2024).

Normality Test Results

To determine if the statistical procedures used in this research were appropriate for the physical fitness data being assessed, the researcher analyzed the normality of muscular strength, muscular endurance, cardiovascular endurance, flexibility, agility, and power. Assessing the normality provides the researcher with information about the factorial distribution of the data and whether the data meets the primary assumption for parametric tests (ANOVA) – factors must follow a normal distribution.

Physical Fitness Component	**Shapiro-Wilk p-value**	**Normality**
Muscular Strength (Half-Squat)	0.62	Normally Distributed
Cardiovascular Endurance (Submaximal Step Test)	0.53	Normally Distributed
Flexibility (Back Scratch Test)	0.75	Normally Distributed
Muscular Endurance (Push-up Test)	0.20	Normally Distributed
Agility (Hexagon Agility Test)	0.15	Normally Distributed
Power (Vertical Jump Test)	0.22	Normally Distributed

Table No. 3. Normality Test p-value of Physical Fitness component

Results of the Shapiro–Wilk Test of Normality for Physical Fitness Data are contained in Table 3. The p-values generated through the study were all above 0.05, confirming that the data were normally distributed. Thus, results of the Shapiro–Wilk Tests confirmed normality for all physical fitness variables making it appropriate to use parametric statistical procedures (specifically, Analysis of Variance [ANOVA]). This provides further support for the accuracy and credibility of the statistical interpretation and findings of this study.

Age Bracket (in yrs. old)	**Sample n**	**Mean**	**Standard Deviation**	**F-ratio**	**p-value**	**Decision**	**Remarks**
Young Adulthood Age (17 - 25)	198	109.12	59.77	21.13	< 0.00001	Reject H_o	Significant
Early Adulthood Age (26 - 35)	20	38.9	39.39				

Middle Adulthood Age (36-above)	10	30.1	36.27
Total	**228**	**99.49**	**62.44**

Table No. 4. Significant Difference in the Muscular Strength of First-year College Students when Grouped according to Age

Table 4 compares muscular strength performance, measured via the Half-Squat Test, across three age groups: young adults (17–25), early adults (26–35), and middle adults (36+). Results revealed significant between-group differences, with young adults (count - n = 198) achieving the highest mean score (Mean = 109.12, SD = 59.77), compared to early adults (count - n = 20, Mean = 38.90) and middle adults (count - n = 10, Mean = 30.10). This pattern indicates that muscular strength performance declined progressively with increasing age. This difference was statistically significant (F = 21.13, p - value < 0.00001), resulting in rejection of the null hypothesis and confirming that age meaningfully influences muscular strength performance among first-year college students. These findings shows that age-related factors—such as higher levels of physical activity and energy among younger students—may contribute to superior muscular strength performance, while the comparatively lower scores among older respondents may reflect a gradual decline in strength and physical conditioning associated with aging. These results highlight the importance of accounting for age-related variation when designing fitness programs and training interventions for college populations.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	70.22	5.37	0.00055	Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	79.02	6.04	0.00009	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	8.80	0.67	0.88285	Not Significant

Table No. 5. Pairwise Comparisons of the Muscular Strength of First-Year College Students when Grouped according to Age

Table 5 presents pairwise comparisons of muscular strength across age groups, confirming that young adults significantly outperformed both early adults (mean difference = 70.22) and middle adults (mean difference = 79.02) on the Half-Squat Test, with both comparisons reaching significance (p < 0.001). This findings confirms the trend of declining strength with age due to factors like higher tensions in youth and different muscle compositions (Dimacurot et al., 2024; Villanueva et al., 2022), as well as age-related degeneration of muscle and neuromuscular function (Santiago & Ibarra, 2023).

Recent studies agree with this point in that young Filipino students are better performers than adults in lower limb strength assessments, as the results greatly decrease after young adulthood (López & Garcia, 2019; Reyes & De Guzman, 2021). This is important information to keep in mind when developing fitness programs for older adults.

Age Bracket (in yrs. old)	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Young Adulthood Age (17 - 25)	198	19.74	11.57				
Early Adulthood Age (26 - 35)	20	12.85	12.83	7.76	0.00055	Reject H_o	Significant
Middle Adulthood Age (36 - above)	10	7.9	6.79				
Total	**228**	**18.62**	**11.87**				

Table No. 6. Significant Difference in the Muscular Endurance of First-Year College Students when Grouped according to Age

Table 6 presents upper-body strength scores (Push-Up Test) across age groups, revealing a clear downward trend with increasing age. Young adulthood age (17–25) recorded the highest mean score (Mean = 19.74, SD = 11.57), followed by Early adulthood age (26–35, Mean = 12.85), and Middle adulthood age (36+), who scored lowest (Mean = 7.90). This difference was statistically significant (F = 7.76, p - value = 0.00055), leading to rejection of the null hypothesis and confirming meaningful variation in upper-body strength across age groups.

These findings shows that age-related physiological changes—including reduced muscle efficiency, lower activity levels, and declining muscular function—contribute to decreased upper-body strength over time. This aligns with prior research indicating that younger adults benefit from faster recovery and greater physiological adaptability to exercise compared to older individuals. Overall, these results reinforce the importance of consistent physical activity and strength training in preserving muscular capacity across the lifespan.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p – value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	6.89	2.63	0.1534	Not Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	11.84	4.52	0.00455	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	4.95	1.89	0.37723	Not Significant

Table No. 7. Pairwise Comparisons of the Muscular Endurance of First-Year College Students when Grouped according to Age

Table 7 indicates that muscular endurance was highest among young adults and lowest among middle-aged adults, suggesting that muscular endurance peaks in young adulthood and declines progressively with age. While young adults outperformed early adults across all variables, this comparison did not reach statistical significance, likely due to the smaller sample size of the early adult group. Nonetheless, the overall trend supports an age-related decline in muscular endurance. These findings align with prior research indicating that muscular endurance peaks during young adulthood before declining due to physiological factors such as reduced muscle mass, diminished muscle performance, and lower physical activity levels (Stewart et al., 2019; Thompson, 2020). Local studies similarly confirm that Filipino youth and young adults demonstrate superior muscular endurance compared to older adults (Reyes & De Guzman, 2020; López & Garcia, 2021), with reduced exercise and gradual muscle loss cited as key contributors to lower endurance among older individuals (Santiago & Ibarra, 2022).

Age Bracket (in yrs. old)	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Young Adulthood Age (17 - 25)	198	130.79	24.86	3.88	0.021997	Reject H_o	Significant
Early Adulthood Age (26 - 35)	20	115.60	21.63				
Middle Adulthood Age (36 - above)	10	122.80	17.99				
Total	**228**	**129.11**	**24.67**				

Table No. 8. Significant Difference in Cardiovascular Endurance of First-Year Students when Grouped according to Age

Table 8 compares cardiovascular endurance performance across three age categories of college freshmen. Young adults (count - n = 198) recorded the highest mean score (Mean = 130.79, SD = 24.86), followed by middle adults (count - n = 10, Mean = 122.80, SD = 17.99) and early adults (count - n = 20, Mean = 115.60, SD = 21.63). This difference was statistically significant (F = 3.88, p - value < .05), supporting rejection of the null hypothesis and confirming meaningful variation in cardiovascular endurance across age groups. These findings shows the relationship between age and cardiovascular endurance, with younger respondents likely benefiting from higher activity levels and greater aerobic capacity. The comparatively lower performance among older groups may reflect age-related physiological changes, including reduced cardiovascular efficiency and lower habitual physical activity. These results highlight the importance of sustained aerobic exercise across adulthood and underscore the need for age-specific fitness programs to support cardiovascular health among college students.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	15.19	2.74	0.0013006	Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	7.99	1.44	0.0056479	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	7.20	1.30	0.62877	Not Significant

Table No. 9. Pairwise Comparisons of the Cardiovascular Endurance of First-Year Students when Grouped according to Age

Table 9 presents pairwise comparisons of cardiovascular endurance across age groups. Young adults exhibited significantly higher cardiovascular endurance than both early adults (mean difference = 15.19, p - value = 0.0013) and middle adults (mean difference = 7.99, p - value = 0.0056). However, no significant difference emerged between early and middle adults (mean difference = 7.20, p - value= 0.629), suggesting comparable endurance levels between these two older groups. These results support previous work showing that cardiovascular fitness peaks in young adulthood and then generally diminishes thereafter. In addition, there is little difference in performance between young adults and middle-aged individuals, suggesting that people continue to exercise into middle age. This seems to be borne out by local studies showing that young Filipino students do better than older students on measures of aerobic fitness (Reyes & De Guzman, 2021), when displayed at least after age 35 (Tan & Hernandez, 2020).

Age Bracket (in yrs. old)	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Young Adulthood Age (17 - 25)	198	5.90	4.24	18.62	< 0.00001	Reject H_o	Significant
Early Adulthood Age (26 - 35)	20	1.39	1.99				
Middle Adulthood Age (36 -above)	10	0.60	0.51				
Total	**228**	**5.28**	**4.31**				

Table No. 10. Significant Difference in the Flexibility of First-Year College Students when Grouped according to Age

Table 3.10 presents flexibility performance (Back Scratch Test) across three age groups, revealing significant differences among respondents. Young adults (count - n = 198) recorded the highest mean flexibility score (Mean = 5.90, SD = 4.24), followed by early adults (count - n = 20, Mean = 1.39, SD = 1.99), with middle adults recording the lowest score (Mean = 0.60, SD = 0.51). This difference was statistically significant (F = 18.62, p - value < 0.00001), leading to rejection of the null hypothesis and confirming meaningful variation in flexibility across age groups.

These results suggest a functional decline in flexibility with increasing age, likely attributable to greater joint mobility, muscle elasticity, and physical activity levels among younger adults, compared to age-related stiffening of muscles, tendons, and connective tissue among older groups. These findings underscore the importance of regular stretching and mobility training in preserving flexibility and preventing future range-of-motion limitations throughout adulthood.

Table 10 exhibits performance outcomes in terms of flexibility (Back Scratch Test data) across three age groups amongst the participants. Young adults (N = 198) achieved the highest mean flexibility (M = 5.90, SD = 4.24), while the mean score got lower for early adults (N = 20, M = 1.39, SD = 1.99), and middle adult group recorded the lower mean (M =0.60, SD =

0.51). Differences reported in the results were significant (F = 18.62, p < 0.00001), leading to a rejection of the null hypothesis. It can be concluded that flexibility gets worse with age as a result of better joint mobility and muscle elasticity and physical activity among young adults as opposed to gradually increasing stiffness of soft tissues with age.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	4.52	4.95	0.00161	Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	5.30	5.82	0.00016	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	0.79	0.86	0.81463	Not Significant

Table No. 11. Pairwise Comparisons of the Flexibility of First-Year College Students when Grouped according to Age

Table 11 includes pairwise analysis of flexibility among different age groups. Compared with young adults, both early adults (mean difference = 4.52, p-value = 0.0016) and middle adults (mean difference = 5.30, p-value = 0.0002) showed lower levels of flexibility. However, flexibility among early adults and middle adults was comparable (mean difference = 0.79, p-value = 0.815). These findings indicate that flexibility reaches its maximum during young adulthood and declines afterwards, consistent with earlier studies linking aging with loss of flexibility (Smith & Wilson, 2017). Notably, no significant difference was found between early adulthood and middle adulthood, suggesting that flexibility reaches its highest levels during early adulthood and declines after that, as the role of physical activity and regular exercises likely contribute to this process (Johnson & Carter, 2019). Their finding is supported by local studies showing that young Filipino adults have the highest level of flexibility and that middle-aged adults compare well with adults from other age groups (Reyes & De Guzman, 2021) and that flexibility reaches its peak during early adulthood with subsequent decreases (López & Garcia, 2019). Furthermore, according to Tan and Hernandez (2020), steady exercises contribute to flexibility maintenance, while joint mobility starts declining in middle adulthood.

Age Bracket (in yrs. old)	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Young Adulthood Age (17 - 25)	198	14.45	4.61	5.17	0.006402	Reject H_o	Significant
Early Adulthood Age (26 - 35)	20	16.60	2.99				
Middle Adulthood Age (36 - above)	10	18.20	3.33				
Total	**228**	**14.81**	**4.53**				

Table No. 12. Significant Difference in the Agility of First-Year College Students when Grouped according to Age

Table 12 presents agility performance (Hexagon Agility Test) across three age groups, revealing significant differences in performance. Young adults recorded the best (lowest) mean score (Mean = 14.45, SD = 4.61), followed by early adults (Mean = 16.60, SD = 2.99), with middle adults recording the poorest performance (Mean = 18.20, SD = 3.33). This difference was statistically significant (F = 5.17, p - value = 0.0064), leading to rejection of the null hypothesis and confirming that agility performance varies meaningfully across age groups. These results shows that agility declines with increasing age, with younger adults demonstrating greater speed, coordination, balance, and capacity for rapid directional change. This decline among older adults may be attributed to age-related reductions in neuromuscular efficiency, reaction time, and muscle elasticity.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	2.15	2.12	0.29185	Not Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	3.75	3.71	0.02526	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	1.60	1.58	0.50328	Not Significant

Table No. 13. Pairwise Comparisons of the Agility of First-Year College Students when Grouped according to Age

Results of the pairwise comparisons for the various age groups of first-year students, as presented in Table 13, indicate that out of the three groups, only the Young adulthood group (ages 17 to 25 years old) and the Middle adulthood group (ages 36 years old and older) have statistically significant differences in agility, and groups is roughly equivalent. The results of this study provide support to the notion that agility varies substantially when comparing younger and older adults directly. The superior performance of younger adults provides further evidence that agility decreases progressively as age increases, consistent with research findings by Smith et al. (2020).

Age Bracket (in yrs. old)	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Young Adulthood Age (17 - 25)	198	37.34	19.44	9.22	0.000142	Reject H_o	Significant
Early Adulthood Age (26 - 35)	20	24.45	15.73				
Middle Adulthood Age (36 - above)	10	16.80	12.76				
Total	**228**	**35.31**	**19.60**				

Table No. 14. Significant Difference in the Power of First-Year College Students when Grouped according to Age

Table 14 illustrates lower body explosive power (measured by Vertical Jump Test) among three different age brackets. Young adults take the lead with the highest recording (Mean = 37.34 cm, SD = 19.44), followed by early adults at (Mean = 24.45 cm, SD = 15.73), while middle adults recorded the least (Mean = 16.80 cm, SD = 12.76). The difference is highly significant statistically (F = 9.22, p - value = 0.000142), so null hypothesis is rejected, confirming the existence of meaningful differences in lower body power among age groups. These findings indicate that younger adults have better lower body power, likely due to higher levels of muscular strength, neuromuscular efficiency, and muscle fiber involvement; while age seems to be associated with a progressive decline in power probably as a result of decreased muscle mass and coordination that appear with old age.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Young Adulthood (17 - 25) vs Early Adulthood Age (26 - 35)	12.89	3.00	0.08828	Not Significant
Young Adulthood (17 - 25) vs Middle Adulthood Age (36 - above)	20.54	4.77	0.00249	Significant
Early Adulthood Age (26 - 35) vs Middle Adulthood Age (36 - above)	7.65	1.78	0.42094	Not Significant

Table No. 15. Pairwise Comparisons of the Power of First-Year College Students when Grouped according to Age

As shown in Table 15, the power of the vertical jump has been compared across the various age categories. Significant differences appear between the young group and the middle-aged group with a mean difference of 20.54 and a p-value of 0.0025 indicating that younger people are significantly more explosive than older adults. No difference was noted between the young group and the group categorized as early adulthood suggesting that power among young people stays constant until it starts declining later. The results are in accordance with previous studies on power loss in old age, which is attributed to the decrease in muscle size and testosterone and an increase in muscle-joint stiffness.

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	90.43	60.61	4.55	0.034056	Reject H_o	Significant
Male	118	107.94	63.19				
Total	**228**	**99.49**	**62.44**				

Table No. 16. Significant Difference in the Muscular Strength of First-Year College Students when Grouped according to Sex

The comparison of lower-body strength (Half-Squat Test) between the male and female students in their first year of college as shown in Table 16. The scores of males (n = 118) were higher in terms of average scores (mean = 107.94) compared to female students (n = 110; mean = 90.43). This indicates the fact that males have a greater lower-body strength than female respondents. The results are statistically significant although they reject the null hypothesis since there is enough evidence regarding the difference in strength between male and female individuals (F = 4.55; p = 0.034). The research results obtained correspond to the data of the previous studies where the authors explain the predominance of males in strength activity by their higher level of musculature and the higher levels of testosterone in male individuals (Johnson & Carter, 2019; Brown & Green, 2020).

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	13.40	7.83	49.93	<0.00001	Reject H_o	Significant
Male	118	23.48	12.92				
Total	**228**	**18.62**	**11.87**				

Table No. 17. Significant Difference in the Muscular Endurance of First-Year College Students when Grouped according to Sex

Table 17 illustrates brother push-up muscular endurance test score comparison data between male and female first-year students in college. Results showed that the average score reported for males (n=118, M=23.48, SD=12.92) was significantly higher than for females (n=110, M=13.40, SD=7.83). The statistical analysis for this was significant (F=49.93, p<0.00001), leading to the rejection of the null hypothesis and showing a significant difference in muscular endurance between males and females. These results support past studies asserting that due to more muscle mass, testosterone secretions, and innervations, males tend to have better muscular endurance than females (Johnson & Carter, 2019; Brown & Green, 2020). Studies conducted locally also suggest that Filipino male students do more push-ups than women due to differences in their muscular structure and growth stages (Reyes & De Guzman, 2021; Santiago & Ibarra, 2022; Lopez & Garcia, 2020).

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	122.29	24.16	7.43	0.006911	Reject H_o	Significant
Male	118	130.98	23.96				
Total	**228**	**126.79**	**24.40**				

Table No. 18. Significant Difference in the Cardiovascular Endurance of First-Year Students when Grouped according to Sex

Table 18 illustrates the male and female students taking the Submaximal Step Test in terms of cardiovascular endurance. The male students (n = 118) displayed a higher mean heart rate (Mean = 130.98, SD = 23.96) when compared with the female counterparts (n = 110, Mean = 122.29, SD = 24.16). There existed a significant difference (F = 7.43, p-value = 0.0069), thus rejecting the null hypothesis. The current findings are in accordance with the feminist literature that attributes the advantages of men when it comes to aerobic fitness as a result of muscle mass, fat mass, and hemoglobin concentration, thus ensuring effective delivery of oxygen to the inflating muscles during the exercise (Johnson & Carter, 2019; Thompson et al., 2020). Local studies have also confirmed that male students outperform female students in terms of cardiovascular endurance due to physiological factors such as muscle mass, hemoglobin concentration, and VO_2 max (López & Garcia, 2020; Reyes & De Guzman, 2021; Santiago & Ibarra, 2022).

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	5.26	4.03	38.13	<0.00001	Reject H_o	Significant
Male	118	2.52	2.55				
Total	**228**	**3.85**	**3.61**				

Table No. 19. Significant Difference in the Flexibility of First-Year College Students when Grouped according to Sex

As presented in Table 19, a comparison of flexibility on the Back Scratch Test between men and women is made among first-year students in college. For the groups of females (n=110), it was noted that on average their mean score in flexibility (M=5.26, SD=4.03) was higher than the mean score of men (n=118, M=2.52, SD=2.55). This difference has been found statistically significant (F=38.13, p<0.00001), thus rejecting the null hypothesis regarding flexibility in men and women. Our findings demonstrate that women gain benefits from greater flexibility over men due to a variety of reasons, namely to hormonal features of female organization that provide a degree of flexibility (Johnson & Carter, 2019; Brown & Green, 2020). In addition to the previous studies, we can see the outperforming men in flexibility among Filipino women due to the levels of estrogen in women (Reyes & De Guzman, 2021; Lopez & Garcia, 2020). Additionally, Santiago and Ibarra (2022) claim that this phenomenon increases with age whereas men tend to lose their flexibility after the period of adolescence but women perform excellently throughout the period of their adulthood. Thus, one can clearly see how important elastic properties of tissues are for flexibility.

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	15.36	4.38	29.92	<0.00001	Reject H_o	Significant
Male	118	12.52	3.43				
Total	**228**	**13.89**	**4.16**				

Table No. 20. Significant Difference in the Agility of First-Year College Students when Grouped according to Sex

As the results from the data contained in Table 20, males scored higher in the agility test (n = 118, M = 12.52, SD = 3.43) compared to female students (n = 110, M = 15.36, SD = 4.38). The difference was statistically relevant (F = 29.92, p < 0.00001) compelling to reject the null hypothesis. This finding correlates with the literature focusing on the physiological and biomechanical aspects of agility as agility is based on explosive power, revolving around the efficiency of muscles and nervous system (Fitzgerald et al., 2018; Thompson et al., 2020). Although females show high flexibility and mobility of joints, males differ due to explosion and stability, which is essential for the success of the performance.

Sex	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Female	110	28.09	11.19	32.90	<0.00001	Reject H_o	Significant
Male	118	42.04	23.11				
Total	**228**	**35.31**	**19.60**				

Table No. 21. Significant Difference in the Power of First-Year College Students when Grouped according to Sex

The information on lower body explosive power as presented in Table 21, based on the outcomes of the Vertical Jump Test obtained from two groups, namely, male and female students of the first academic year of college. The average scores achieved by male students (n = 118) (mean = 42.04) were considerably higher than those of female students (n = 110) (mean = 28.09). The analysis of variance indicates a significant result (F=32.90, p<0.00001), which also confirms the first hypothesis of the study, since there are significant differences between the scores of male and female students. The performance of male students in terms of power and strength characteristics confirms earlier studies regarding male superiority in this respect due to the higher amount of muscle mass and strength. In addition, studies established in the Philippines state that male students have performed better than female students during vertical jump testing [Fernandez & Reyes, 2018; Santos & Garcia, 2019]. Muscle mass and anaerobic capacity are regarded as the factors affecting the male students' activity in this area.

Body Type	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	103.24	68.87				
Mesomorph	42	117.93	53.66	5.08	0.006985	Reject H_o	Significant
Endomorph	67	99.49	50.61				
Total	**228**	**106.87**	**62.44**				

Table No. 22. Significant Difference in the Muscular Strength of First-Year Students when Grouped according to Body Type

Table 22 compares muscular strength (Half-Squat Test) across body types. Mesomorphs (n = 42) recorded the highest mean score (M = 117.93, SD = 53.66), followed by ectomorphs (n = 119, M = 103.24, SD = 68.87), with endomorphs (n = 67) recording the lowest score (M = 99.49, SD = 50.61). This difference was statistically significant (F = 5.08, p = 0.0070), leading to rejection of the null hypothesis and confirming meaningful variation in muscular strength across body types. These findings suggest that mesomorphs' naturally greater muscle mass and athletic build provide an advantage in strength-based tasks, while ectomorphs' leaner structure and endomorphs' higher fat-to-muscle ratio may limit comparable performance, consistent with sport science research linking mesomorphic body composition to superior strength and power performance relative to other somatotypes.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	14.69	1.91	0.36895	Not Significant
Ectomorph vs Endomorph	21.97	2.86	0.10960	Not Significant
Mesomorph vs Endomorph	36.66	4.77	0.00253	Significant

Table No. 23. Pairwise Comparisons in the Muscular Strength of First-Year students when Grouped according to Body type

Table 23 illustrates pairwise comparisons of strength in accordance to body types. Mesomorphs showed significant differences compared to endomorphs (mean difference = 36.66, p = 0.0025) which indicates the superiority of muscular strength in the case of mesomorphic individuals. No significant differences were found in the pairwise comparisons of mesomorphs and ectomorphs (mean difference = 14.69, p = 0.369) and ectomorphs and endomorphs (mean difference = 21.97, p = 0.110). The findings indicate the importance of body composition on muscle strength formation. Mesomorphs have a higher amount of lean mass and a more balanced relation of muscle and fat tissues, which gives them a possibility to demonstrate higher performance in strength exercises such as the Half-Squat Test. Ectomorphs and endomorphs are less successful due to the reasons of thinner body type among ectomorphs and the higher percentage of body fat among endomorphs. Thus, the findings support the influence of body type on fitness results.

Body Type	Sample, n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	25.83	7.45				
Mesomorph	42	47.64	6.06	218.59	<0.00001	Reject H_o	Significant
Endomorph	67	20.58	6.10				
Total	**228**	**28.31**	**11.68**				

Table No. 24. Significant Difference in the Muscular Endurance of First-Year Students when Grouped according to Body Type

The results provided in Table 24 reveals comparisons regarding muscular endurance in regard to Push-Up Test results. Certainly, mesomorphs (n = 42 group of people) scored better than any other groups with the mean score of the group equals 47.64 (SD = 6.06). Ectomorphs (n = 119; M = 25.83 SD =7.45) came second and endomorphs (n = 67) scored results that were the lowest with their mean equaling 20.58. The differences are statistically significant at F = 218.59 (p < 0.00001), thus null hypothesis is totally rejected. The results of the research show the superiority of mesomorphs in use of their muscles being in great shape while doing any kind of work which involves using upper body muscles as well as supports the idea that mesomorphic model of body is better at muscular endurance than ectomorphic or endomorphic.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	21.81	25.45	0.00001	Significant
Ectomorph vs Endomorph	5.25	6.13	0.00007	Significant
Mesomorph vs Endomorph	27.06	31.58	0.00001	Significant

Table No. 25. Pairwise Comparisons in the Muscular Endurance of First-Year Students when Grouped according to Body Type

Table 25 presents pairwise comparisons of muscular endurance across body types, revealing significant differences in all comparisons. Mesomorphs significantly outperformed both ectomorphs (mean difference = 21.81, p = 0.00001) and endomorphs (mean difference = 27.06, p = 0.00001), while ectomorphs also outperformed endomorphs (mean difference = 5.25, p = 0.00007), with mesomorphs recording the highest endurance performance overall, followed by ectomorphs and then endomorphs. These results reinforce the influence of body composition on upper-body muscular endurance. Mesomorphs' favorable muscle-to-fat ratio and greater lean mass likely support more efficient force production during repetitive tasks such as push-ups (Johnson & Carter, 2019). Ectomorphs may benefit moderately from lower body fat and lighter body weight despite less muscle development (Brown & Green, 2020), whereas endomorphs' higher body fat composition likely reduces efficiency during bodyweight endurance exercises.

Body Type	Sample, n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	124.82	23.03				
Mesomorph	42	132.86	24.75	3.92	0.021234	Reject H_o	Significant
Endomorph	67	134.39	26.36				
Total	**228**	**129.11**	**24.67**				

Table No. 26. Significant Difference in the Cardio-vascular Endurance of First-Year Students when Grouped to Body Type

Table 26 depicts a comparison of cardiovascular endurance among different types of body composition in individuals. Among the three groups, individuals with an endomorphic body type (n = 67) achieved the highest mean heart rate of 134.39 (SD = 26.36), followed by the mesomorphic group (n = 42, M = 132.86, SD = 24.75), while the ectomorphic group had the lowest mean heart rate (M = 124.82, SD = 23.03). The variation in means was significant for the variability of F = 3.92 and p = 0.0213, allowing for the rejection of the null hypothesis, and therefore reaffirming that cardiovascular endurance is significantly influenced by the body type.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	21.81	25.45	0.00001	Significant
Ectomorph vs Endomorph	5.25	6.13	0.00007	Significant
Mesomorph vs Endomorph	27.06	31.58	0.00001	Significant

Table No. 27. Pairwise Comparisons in the Cardiovascular Endurance of First-Year Students when Grouped to Body Type

Table 27 shows comparisons among different somatotypes on cardiovascular endurance. There was a significant difference between ectomorphs and endomorphs (mean difference = 9.57; p = 0.0205). There was no significant difference between ectomorphs and mesomorphs (mean difference = 8.04; p = 0.152) and mesomorphs and endomorphs (mean difference = 1.53; p = 0.933). These results give credence to body composition as a good predictor of cardiovascular endurance as seen in various studies looking into somatotypes and endurance abilities on Filipino youth (Reyes & De Guzman, 2021; Lopez & Garcia, 2020; Santiago & Ibarra, 2022).

Body Type	Sample, n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	5.8	4.43				
Mesomorph	42	5.98	4.16	5.02	0.007362	Reject H_o	Significant
Endomorph	67	3.90	3.92				
Total	**228**	**5.28**	**4.31**				

Table No. 28. Significant Difference of the Flexibility of First-Year College Students when Grouped according to Body Type

Table 28 compares flexibility performance between body types (Back Scratch Test). Mesomorphs (n = 42) obtained the highest average score (M = 5.98, SD = 4.16) and were closely followed by ectomorphs (n = 119, M = 5.80, SD = 4.43), while endomorphs (n = 67) had the lowest scores (M = 3.90, SD = 3.92). The differences were statistically significant (F = 5.02, p = 0.0074), meaning that null hypothesis was rejected and variability in flexibility between the body types was proved. It was expected that ectomorphs and mesomorphs would tend to be more flexible than endomorphs. The reasons for such differences could be varied body fat percentage and composition of muscles: lower body fat of ectomorphs is likely to help them avoid being restricted in moves and balanced muscle development of mesomorphs leads to similar improvements in flexibility.

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	0.18	0.34	0.96849	Not Significant
Ectomorph vs Endomorph	1.90	3.58	0.03241	Significant
Mesomorph vs Endomorph	2.08	3.92	0.01668	Significant

Table No. 29. Pairwise Comparisons of the Flexibility of First-Year College students when Grouped according to Body Type

Table 29 presents pairwise comparisons of flexibility across body types. Both ectomorphs and mesomorphs significantly outperformed endomorphs (mean differences = 1.90, p = 0.0324; and 2.08, p = 0.0167, respectively), while no significant difference emerged between ectomorphs and mesomorphs (mean difference = 0.18, p = 0.968), suggesting comparable flexibility between these two groups. These results reinforce body composition as a key factor in flexibility performance.

Endomorphs' greater body fat percentage and body mass likely restrict joint range of motion, with flexibility tending to decline as body fat increases due to reduced movement efficiency (Clark & Edwards, 2018). In contrast, ectomorphs' leaner composition supports greater joint mobility (Johnson & Carter, 2019), while mesomorphs' balanced muscle-to-fat ratio similarly allows efficient movement without significantly limiting flexibility (Brown & Green, 2020). Local studies support these findings, reporting that Filipino endomorphic students score lowest on flexibility assessments, while ectomorphic and mesomorphic students perform comparably better due to lower fat mass and more favorable body composition (Reyes & De Guzman, 2021; Lopez & Garcia, 2020).

Body Type	Sample n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	15.10	2.24				
Mesomorph	42	14.99	1.98	49.28	< 0.00001	Reject H_o	Significant
Endomorph	67	18.74	3.27				
Total	**228**	**16.15**	**3.04**				

Table No. 30. Significant Difference of the Agility of First-Year College Students when Grouped according to Body Type

Table 30 presents an analysis of results of agility attained by different body types (Hexagon Agility Test). The mesomorphs (n=42) achieved the best performance with a mean of 14.99 (SD=1.98), while ectomorphs stood in the second place (n=119, mean=15.10, SD=2.24) and were followed by the endomorphs (n=67) who showed the worst performance (mean=18.74, SD=3.27). Since lower figures denote better agility, the results confirm that mesomorphs and ectomorphs have a considerable advantage over endomorphs. This difference is statistically essential (F = 49.28, p < 0.00001) which leads to the null hypothesis rejection and provides evidence that body composition determines agility performance. The outcomes show that mesomorphs benefit from well-balanced muscle mass for achieving excellent agility results while ectomorphs' advantages are due to lower body weight which allows swift movements with low inertia. At the same time, it should be noted that ectomorphs possibly have lower potential for quick jumps in comparison with mesomorphs.

Table No. 31. Pairwise Comparisons of the Agility of First-Year College Students when Grouped according to Body Type

The findings presented in Table 31 indicate significant differences in agility among body types. In comparison with the average performance of endomorphs, both ectomorphs and mesomorphs showed higher scores (mean differences = 3.64,

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	0.11	0.35	0.96741	Not Significant
Ectomorph vs Endomorph	3.64	11.42	0.00003	Significant
Mesomorph vs Endomorph	3.75	11.77	0.00005	Significant

p = 0.00003), and (mean difference = 3.75, p = 0.00005), correspondingly. This study has shown no substantial differences between ecto-and meso-morphs (mean difference = 0.11, p = 0.967), indicating similar agility levels. The explanation for this could be in the muscle mass and fat percentage of mesomorphs and ectomorphs, which favorably influence their activity. The disadvantages of endomorphs should be mentioned as their body weight and fat indexes seem to have negative effects on their agility (Reyes, De Guzman, 2020; Lopez, Garcia, 2019; Kerr, Mellinger, 2015; Peterson, Callahan, 2016).

Body Type	Sample, n	Mean	Standard Deviation	F-ratio	p-value	Decision	Remarks
Ectomorph	119	35.87	20.19				
Mesomorph	42	40.54	17.68	3.06	0.048751	Reject H_o	Significant
Endomorph	67	31.19	19.04				
Total	**228**	**35.35**	**19.60**				

Table No. 32. Significant Difference of the Power of First-Year College Students when Grouped according to Body Type

Table 32 compares lower-body explosive power (Vertical Jump Test) across body types. Mesomorphs (count - n = 42) recorded the highest mean score with the least variability (Mean = 40.54, SD = 17.68), followed by ectomorphs (count - n = 119, Mean = 35.87, SD = 20.19), with endomorphs (count - n = 67) recording the lowest performance (Mean = 31.19, SD = 19.04). This difference was statistically significant (F = 3.06, p - value = 0.0488), leading to rejection of the null hypothesis and confirming that vertical jump performance varies meaningfully across body types. These findings shows that body composition—particularly the muscle development and muscle-to-fat ratio associated with mesomorphic physiology—plays a meaningful role in explosive lower-body power performance.

Table No. 33. Pairwise Comparisons of the Power of First-Year College Students when Grouped according to Body Type

Table 33 presents pairwise comparisons of power performance across body types. A significant difference emerged only between mesomorphs and endomorphs (mean difference = 9.35, p = 0.0201), confirming mesomorphs' superior vertical jump performance. No significant differences were found between ectomorphs and mesomorphs (mean difference = 4.67, p = 0.368) or between ectomorphs and endomorphs (mean difference = 4.37, p = 0.368), suggesting ectomorphs' performance fell between, and was statistically comparable to, both groups. These findings shows that mesomorphs' greater musculature and favorable power-to-weight ratio support superior explosive force production relative to endomorphs (Brown & Green, 2020; Johnson & Carter, 2019).

Comparison	Mean Difference	Range Statistic, $Q_{0.05}$	p - value	Significance
Ectomorph vs Mesomorph	4.67	1.91	0.36836	Not Significant
Ectomorph vs Endomorph	4.67	1.91	0.36786	Not Significant
Mesomorph vs Endomorph	9.35	3.82	0.02010	Significant

Fitness Component	Test	Mean Score	(Interpretation) - Strength / Weakness
Cardio-vascular Endurance	Submaximal Step	129.11 bpm	(High) – Strength
Flexibility	Back Scratch	5.28cm	(High) – Strength
Muscular Strength	Half-squat	99.49s	(Typical) - Strength
Muscular Endurance	Push-up	18.62 reps	(Low) - Weakness
Agility	Hexagon Agility	14.81s	(Low) - Weakness
Power	Vertical Jump	35.31cm	(Low) - Weakness

Table No. 34. Strengths, Weaknesses, and Developmental Needs of First-Year College Students

Note: Scoring Guide for the Health-Related Fitness Test: for Muscular Endurance (Half Squat), 130 and above (High), 70–129 (Typical), and 69 and below (Low); for Muscular Endurance (Push-Up), 45 and above (High), 25–44 (Typical), and 24 and below (Low); for Cardiovascular Endurance (Submaximal Step Test), below 144 (High), 145–167 (Typical), and 168 and above (Low); for Flexibility (Back-Scratch Test), above (High), -3 to 4 (Typical), and below -4 (Low). Scoring Guide for the Skill-Related Fitness Test: for Agility (Hexagon Agility Test), below 11.7 (High), 11.8–13.9 (Typical), and 14.0 and above (Low); for Power (Vertical Jump Test), above 61 (High), 54–60 (Typical), and 53 and below (Low). For Interpretation: High and Typical (Strength), and Low (Weakness).

Strengths

The results indicates the good cardiovascular endurance of students shown by the low average heart rate during the Submaximal Step Test (129.11 BPM), which indicates sufficient capacity for prolonged aerobic exercise possibly resulting from the students' daily activity and commuting behavior that enables them to engage in physical exercise on a regular basis as proven by studies conducted on the positive impact of physical activity on cardiovascular health. Furthermore, the students demonstrated high level of flexibility shown by their results on the Back-Scratch Test (M = 5.28 cm), which reflects sufficient shoulder and upper body movement range which leads to better movement efficiency and decreased risk of injuries, as well as improved posture and lowered muscle tension during the activity (Johnson & Carter, 2019). It is important that in terms of strength, the results suggest the usual level of strength sufficient for daily physical activities; however, there is a possibility for further improvement which can be achieved through the resistance exercise or muscle training (Brown & Green, 2020).

Weaknesses

While students performed well in cardiovascular endurance and flexibility, they scored notably lower in muscular endurance, agility, and power. The mean Push-Up Test score (18.62 repetitions) indicates limited upper-body endurance, which may hinder participation in activities requiring sustained muscular effort (Santiago & Ibarra, 2022); resistance and endurance training are recommended to address this gap. Agility was similarly low, with a mean Hexagon Agility Test time of 14.81 seconds, suggesting difficulty with rapid directional change and coordinated movement, potentially reflecting limited neuromuscular training or exposure to coordination-based activities (Vargas et al., 2025); agility drills such as dynamic movement exercises, ladder drills, and reaction-based training may help improve coordination, balance, and reaction time. Power output was also low, as reflected in the mean vertical jump score (35.31 cm), indicating limited explosive strength critical for high-intensity activities like jumping and sprinting. Since explosive power depends on neuromuscular efficiency and fast-twitch muscle fiber development, targeted training such as plyometric exercises combined with structured strength training is recommended to improve students' explosive power and overall athletic performance (Steele, 2024).

Developmental Needs

These findings point to several targeted areas for intervention in first-year college students' physical fitness development. Given the low Push-Up Test scores, a progressive resistance training program incorporating exercises is recommended to build upper-body muscular endurance and strength, both essential for sustained physical exertion. Low agility scores similarly suggest a need for structured agility training to improve neuromuscular coordination, balance, and movement efficiency; complementary practices may further support flexibility, coordination, and postural stability, consistent with research linking regular agility training to improved neuromuscular performance (Thompson et al., 2020). Low Vertical Jump Test scores point to the need for explosive power development through plyometric exercises combined with resistance training (Steele, 2024). While students demonstrated strong cardiovascular endurance and flexibility, muscular strength, endurance; agility, and power remain areas requiring more deliberate attention. A comprehensive fitness program integrating aerobic conditioning, flexibility work, resistance training, and agility drills would support more balanced development, as neglecting any single component may limit overall physical performance. Addressing these areas through a holistic approach may help first-year students build a more well-rounded fitness profile, supporting both long-term health and their capacity to meet future academic and physical demands.

Conclusion and Recommendations

The results of the study supports several conclusions regarding the demographic and physical fitness profile of first-year college students. In terms of demographics, most respondents fell within the Young Adulthood bracket (17–25 years old), with a mean age of 20.74 years, consistent with typical undergraduate age distributions (Education Data Initiative, 2025; National Center for Education Statistics, 2024; Santos & Tan, 2023). Male respondents slightly outnumbered females, mirroring national enrollment trends and ensuring adequate representation for comparative analysis (San Buenaventura, 2019; Philippine Statistics Authority, 2021), while most students were classified as ectomorphic, reflecting the physically active, commuting-based lifestyle typical of Filipino college students (Antos & Suarez, 2025, as cited in Cobar et al., 2025; Palma et al., 2024). With respect to physical fitness, students showed strong cardiovascular endurance and flexibility alongside average muscular strength, but low muscular endurance — suggesting that daily activity supports aerobic health without sufficiently building upper-body strength-endurance (López & Garcia, 2021; Santiago & Ibarra, 2022). Skill-related components followed a similar pattern, with students demonstrating low agility and power, indicating that routine daily movement does not adequately develop the fast-twitch muscle activation and neuromuscular coordination these components require (Santiago, 2024; Steele, 2024). Further analysis revealed that demographic characteristics significantly influence fitness outcomes: the null hypothesis of no difference in fitness levels by age, sex, and body type was rejected across all three variables, with Young Adulthood, male, and mesomorphic students generally outperforming their counterparts across most components, while female students showed significantly greater flexibility — confirming that demographic factors are meaningful predictors of fitness performance among first-year students.

Taken together, these results point to cardiovascular endurance and flexibility as students' clearest strengths, while muscular endurance, agility, and power emerge as the most consistent developmental gaps. This imbalance suggests that students' current lifestyle and activity patterns build certain fitness components at the expense of others — a gap that structured, targeted training can address. Accordingly, the Movement Competency Training syllabus under PATHFit, while adequately supporting cardiovascular and flexibility development, requires targeted revision to strengthen muscular endurance, agility, and power. These findings justify a focused, evidence-based revision of the syllabus — one that preserves its existing strengths while directly addressing the identified developmental gaps.

Based on the findings and conclusions of the study, several recommendations are put forward. For curriculum planners and PATHFit coordinators, the Movement Competency Training syllabus should be revised to explicitly retain activities supporting cardiovascular endurance and flexibility, while adding structured components for muscular endurance, agility, and power, rather than concentrating on isolated fitness components. Training should also be differentiated by demographic group, including age-appropriate programming (strength maintenance for older students, with an aerobic and flexibility emphasis to offset age-related decline), sex-appropriate programming (agility and flexibility emphasis for male students, upper-body strength and aerobic emphasis for female students), and body-type-appropriate programming (resistance and power training for ectomorphs, balanced cardiovascular-strength training for mesomorphs, and resistance-aerobic training for endomorphs). For PATHFit instructors, it is recommended that structured resistance and endurance-training activities—such as push-ups, planks, and bench presses—be incorporated to address the identified deficiency in upper-body muscular endurance. Agility drills, including cone drills, ladder drills, shuttle runs, and reaction drills, should also be integrated to build coordination, balance, and rapid directional movement. In addition, plyometric and explosive-strength exercises, such as box jumps, squat jumps, and depth jumps, should be included alongside resistance training such as squats, lunges, and deadlifts to develop power and fast-twitch muscle activation. For future researchers, it is recommended that the study be expanded through a larger, more diverse sample across multiple institutions, that a longitudinal design be adopted to track physical fitness changes over time, and that qualitative methods such as interviews and focus groups be incorporated to explore students' attitudes and motivations toward fitness participation.

Overall, the study achieved its purpose of establishing an evidence-based physical fitness profile of first-year college students, revealing a consistent pattern of aerobic and flexibility strength alongside gaps in muscular endurance, agility, and power. These findings provide a concrete, data-driven foundation for revising the PATHFit Movement Competency Training syllabus to better meet the actual needs of incoming students.

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Competing Interests Statement

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Data Availability Statement

The data generated and analyzed in this study are not publicly available due to the informed consent signed by the respondents, which restrict the disclosure of their data to protect their privacy and confidentiality. The data were collected with the permission and approval from the institution.

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Appendices

No appendices are attached to this study.