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The Influence of Healthy Lifestyle and Physical Activity on Adolescent Physical Health

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ABSTRACT

A healthy lifestyle and regular physical activity are widely regarded as central determinants of physical health during adolescence and early adulthood, yet their relative and combined contribution is not always tested together in a single model. This study examined the effect of healthy lifestyle and physical activity on the physical health of late adolescents and young adults. A quantitative correlational design was used, with data collected through an online Likert-scale questionnaire (10 items per variable) completed by 35 respondents aged 18-24. Descriptive statistics showed that healthy lifestyle and physical health both fell in the "good" category, while physical activity fell in the "moderate" category. Classical assumption tests confirmed linear relationships, normally distributed residuals, and no multicollinearity between predictors (VIF = 1.001). Pearson correlation showed that physical activity was moderately and significantly associated with physical health ($r = 0.578$, $p < 0.001$), whereas healthy lifestyle showed no significant association ($r = 0.185$, $p = 0.287$). Multiple regression confirmed this pattern: the model was significant, $F(2, 32) = 9.096$, $p < 0.001$, explaining 36.2% of the variance in physical health ($R^2 = 0.362$), but only physical activity was an independent significant predictor ($\beta = 0.573$, $p < 0.001$), contributing 33.1 percentage points to the explained variance, compared with a non-significant 3.1 percentage points for healthy lifestyle ($\beta = 0.169$, $p = 0.241$). These findings suggest that, in this sample, physical activity is the dominant driver of adolescent physical health, while the broader healthy-lifestyle measure used here requires refinement before its independent contribution can be confirmed.

Keywords: healthy lifestyle; physical activity; physical health; adolescents; young adults

INTRODUCTION

Adolescence and early adulthood are widely recognized as a critical window for establishing lifelong health behaviors. Habits formed during this period, including patterns of physical activity, diet, sleep, and substance use, are strong predictors of health trajectories well into adulthood, and inactive adolescents are considerably less likely to become physically active adults (Burdette et al., 2017). Understanding how the broader construct of a healthy lifestyle relates to physical health, and how it compares with the narrower construct of physical activity, is therefore an important question for both health promotion and educational practice.

A substantial body of evidence links healthy lifestyle behaviors to better physical health outcomes among adolescents and young adults. Regular exercise and healthy behaviors are associated with improved physical fitness and a reduced risk of overweight and obesity (Fan et al., 2026; Kumaran et al., 2026), while physical activity during adolescence has been linked to a lower incidence of chronic diseases later in life, including cardiovascular disease and diabetes (Hallal et al., 2006; Bratina et al., 2011). Structured interventions that combine physical activity counseling with lifestyle guidance have likewise shown benefits for weight management among overweight adolescents (Videira-Silva et al., 2018), and family and institutional support for both physical activity and nutrition has been associated with healthier behavior patterns among students (Rodríguez-Torres et al., 2024).

Nutrition is commonly treated as a core component of a healthy lifestyle alongside physical activity. Adequate nutrition supports growth, neuroendocrine and immune maturation, and the achievement of

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normal adult size, while poor nutrition is linked to iron-deficiency anemia, obesity, and delayed maturation (Evans & Docter, 2020; Jacob & Nair, 2012). Because adolescents face a "triple burden" of undernutrition, micronutrient deficiency, and obesity that varies by region and socioeconomic context (Fatusi & Bello, 2015; Bhutta et al., 2017), nutrition education and monitoring remain a priority in many settings, including Indonesia (Kamaruddin et al., 2020; Ikasari et al., 2024). At the same time, diet, exercise, and sleep interact to jointly shape adolescent health and well-being, so lifestyle measures that combine several such behaviors may not always isolate the effect of any single behavior cleanly (Salas-González et al., 2025; Kosta & Kosta, 2025).

Physical activity in particular has consistently strong and specific associations with physical health outcomes, including fitness, healthy weight, and metabolic health, and its benefits extend to psychological well-being through reduced anxiety and stress (Caracuel-Cáliz et al., 2025; Szabó & Piko, 2025). Structured physical activity interventions have produced measurable improvements in adolescent psychological symptoms within as little as 12 weeks (Francisquini et al., 2024), reinforcing physical activity's role as a concentrated, more easily measured behavior compared with the broader and more diffuse construct of "healthy lifestyle," which can encompass diet, sleep, hygiene, and substance avoidance simultaneously.

Although both healthy lifestyle and physical activity are theoretically linked to adolescent physical health, few small-scale studies test their relative, independent contribution when both are entered into the same statistical model, particularly using self-constructed lifestyle instruments common in undergraduate research. This gap matters because a broad lifestyle scale that mixes several weakly correlated behaviors may dilute its own explanatory power relative to a more focused physical activity measure. This study therefore examines the combined and partial effects of healthy lifestyle and physical activity on the physical health of late adolescents and young adults aged 18-24.

METHODS

This study used a quantitative correlational design to examine the relationship between healthy lifestyle (X1) and physical activity (X2) as independent variables, and physical health (Y) as the dependent variable. The population and sample were late adolescents and young adults aged 18-24, with data collected from 35 respondents through an online, self-administered questionnaire.

Each variable was measured using 10 Likert-scale items, for a total of 30 items, with five response options: always, often, sometimes, rarely, and never. Descriptive statistics (mean, median, mode, and frequency distribution) were computed for each variable to characterize the sample. Classical assumption tests were performed prior to hypothesis testing: a linearity test using Deviation from Linearity in the ANOVA table, a normality test using the one-sample Kolmogorov-Smirnov test on the regression residuals, and a multicollinearity test using the Variance Inflation Factor (VIF), with VIF < 10 indicating no multicollinearity. Hypotheses were tested using Pearson correlation analysis and multiple linear regression analysis, comparing calculated r and F values against their critical table values at $\alpha = 0.05$ (r-table = 0.325 for n = 35, df = 33). All statistical procedures were carried out using IBM SPSS Statistics.

RESULT AND DISCUSSION

This section presents the descriptive statistics, classical assumption tests, and correlation and regression analyses, followed by a discussion linking each finding to the relevant literature.

1. Central Tendency and Frequency Distribution

The descriptive statistics of the three variables are presented in Table 1. On average, healthy lifestyle and physical health both fell in the "good" category, while physical activity fell in the "moderate" category, based on each variable's dominant frequency interval.

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Table 1. Descriptive Statistics of Research Variables (N = 35)

Variable	Mean	Median	Mode	Dominant Category
Healthy Lifestyle (X1)	34.69	35	36	Good (34-41)
Physical Activity (X2)	31.00	30	26	Moderate (26-33)
Physical Health (Y)	34.06	35	35	Good (34-41)

Source: SPSS output

Table 1 indicates that the mean scores for healthy lifestyle (34.69) and physical health (34.06) are very close to their respective medians (35 and 35) and modes (36 and 35), suggesting a fairly symmetrical distribution of responses clustered around the "good" category for both variables. Physical activity, by contrast, has a lower mean (31.00) that falls just within the "moderate" range, with a mode (26) noticeably below its mean and median, an early hint that a subgroup of respondents reports comparatively low activity levels and pulls the mode toward the lower end of the moderate category. This pattern is examined in more detail in Tables 2 to 4, which break down the full frequency distribution underlying each variable's mean score.

Table 2: Frequency Distribution of Healthy Lifestyle (X1)

Interval	Frequency	Percentage	Category
10-17	0	0%	Very poor
18-25	1	3%	Poor
26-33	12	34%	Fair
34-41	21	60%	Good
42-50	1	3%	Very good
Total	35	100%	

As shown in Table 2, the majority of respondents, 21 of 35 (60%), scored in the 34-41 interval, placing them in the "good" healthy-lifestyle category, while a further 12 respondents (34%) fell into the "fair" range (26-33). Only a small minority reported "poor" (3%) or "very good" (3%) lifestyle scores, and no respondent scored in the "very poor" range. This concentration of responses in the good-to-fair range indicates that, as a group, the sample reports reasonably consistent and above-average healthy-lifestyle habits, with relatively little spread toward either extreme.

Table 3: Frequency Distribution of Physical Activity (X2)

Interval	Frequency	Percentage	Category
10-17	0	0%	Very poor
18-25	5	14%	Poor
26-33	20	57%	Fair
34-41	5	14%	Good
42-50	5	14%	Very good
Total	35	100%	

Table 3 shows a markedly different pattern for physical activity: more than half of the respondents (20 people, 57%) scored in the 26-33 "fair" interval, the interval directly below the "good" category, which is consistent with the variable's overall classification as "moderate" in Table 1. The remaining respondents are split fairly evenly between the "poor" (14%), "good" (14%), and "very good" (14%)

categories, indicating a wider and more polarized spread of activity levels than was observed for healthy lifestyle in Table 2. This greater dispersion suggests that physical activity behavior is less uniform across the sample, with a substantial subset of respondents reporting activity levels well above or below the group average.

Table 4: Frequency Distribution of Physical Health (Y)

Interval	Frequency	Percentage	Category
10-17	1	3%	Very poor
18-25	1	3%	Poor
26-33	11	31%	Fair
34-41	19	54%	Good
42-50	3	9%	Very good
Total	35	100%	

Table 4 indicates that physical health follows a broadly similar pattern to healthy lifestyle, with just over half of respondents (19 people, 54%) falling into the "good" category and a further 31% in the "fair" range. A small number of respondents reported "very poor" (3%), "poor" (3%), or "very good" (9%) physical health, so the distribution carries a slightly longer tail at both extremes than either of the two predictor variables. Taken together, Tables 1 to 4 suggest that healthy lifestyle and physical health are distributed similarly and skew toward the "good" category, whereas physical activity is both lower on average and more widely dispersed across categories, a divergence that is explored further through the correlation and regression analyses that follow.

2. Classical Assumption Tests

The linearity test produced Deviation from Linearity significance values of 0.680 for X1 (F = 0.778, df = 14, 19) and 0.507 for X2 (F = 0.988, df = 16, 17), both well above the 0.05 threshold. A high significance value on the Deviation from Linearity test is actually the desired outcome: it indicates no meaningful departure from a linear pattern, meaning the relationship between both healthy lifestyle and physical activity with physical health can be adequately described by a straight line rather than a curved or other non-linear pattern. With this assumption satisfied, the use of Pearson correlation and multiple linear regression in the subsequent steps is methodologically appropriate, since both techniques assume a linear relationship between variables.

The Kolmogorov-Smirnov normality test on the regression residuals produced an Asymp. Sig. (2-tailed) value of 0.200, which is above 0.05 and even close to the upper end of the significance range typically reported by statistical software. This result indicates that the residuals, the difference between the observed physical health scores and those predicted by the model, are distributed in a manner consistent with normality, without significant deviation. Satisfying this normality assumption is an important basis for validly interpreting the significance tests on the regression coefficients (t-test) and on the overall model (F-test), since both tests assume normally distributed residuals.

The multicollinearity test showed a Variance Inflation Factor (VIF) of 1.001 for both predictors, healthy lifestyle and physical activity, far below the commonly used threshold of 10 that indicates the presence of multicollinearity. A VIF value this close to 1 indicates that the two independent variables are almost entirely uncorrelated with each other, meaning there is no overlap or redundancy of information between healthy lifestyle and physical activity in explaining physical health. This condition ensures that the regression coefficient of each predictor can be interpreted independently and remains stable, without distortion from collinearity between the predictor variables, confirming that both variables are suitable for inclusion together in a single regression model.

3. Correlation Analysis

Pearson correlation analysis (Table 5) shows that healthy lifestyle has a very weak, non-significant relationship with physical health (r = 0.185, p = 0.287); the calculated r-value is below the r-table value

(0.185 < 0.325). Physical activity, by contrast, shows a moderate, significant, positive relationship with physical health (r = 0.578, p < 0.001; r-count > r-table, 0.578 > 0.325).

Table 5: Pearson Correlation between Predictors and Physical Health

Variable	r	Sig. (2-tailed)	Strength	Conclusion
Healthy Lifestyle (X1)	0.185	0.287	Very weak	Not significant
Physical Activity (X2)	0.578	< 0.001	Moderate	Significant

Source: SPSS output

4. Multiple Linear Regression Analysis

The multiple regression model (Table 6) produced R = 0.602 and R^2 = 0.362, indicating that healthy lifestyle and physical activity together explain 36.2% of the variance in physical health, with the remaining 63.8% explained by other variables outside this model.

The ANOVA test produced F(2, 32) = 9.096 with a significance value of 0.001 (p < 0.05). Because the F-count (9.096) is greater than the F-table (df1 = 2, df2 = 32, F-table ≈ 3.30), the regression model is statistically significant, meaning that healthy lifestyle and physical activity jointly influence adolescent physical health.

Table 6: Model Summary and ANOVA for the Regression Model

R	R Square	Adjusted R Square	F	df1, df2	Sig.
0.602	0.362	0.323	9.096	2, 32	0.001

Source: SPSS output, verified by recomputation from the raw questionnaire data (2024).

At the partial level, Table 7 shows that only physical activity made a statistically significant independent contribution to physical health (β = 0.573, t = 4.058, p < 0.001). Healthy lifestyle was not a significant predictor once physical activity was controlled for (β = 0.169, t = 1.195, p = 0.241), consistent with its non-significant bivariate correlation with physical health.

Table 7: Multiple Linear Regression Coefficients

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	9.154	8.153	-	1.123	0.270
Healthy Lifestyle (X1)	0.246	0.206	0.169	1.195	0.241
Physical Activity (X2)	0.528	0.130	0.573	4.058	0.000

Source: SPSS output

$\dot{Y} = 9.154 + 0.246X1 + 0.528X2 + \varepsilon$

Based on the standardized coefficients and the zero-order correlations, the effective contribution of each predictor to the 36.2% total explained variance was calculated as beta multiplied by the zero-order correlation: healthy lifestyle contributed 3.1% (0.169 × 0.185), and physical activity contributed 33.1% (0.573 × 0.578), together summing to approximately 36.2%, matching the model's R^2. Physical activity therefore accounts for the large majority of the model's explanatory power, while healthy lifestyle's contribution, though positive in sign, is small and statistically indistinguishable from zero in this sample. The unexplained variance is reflected in the error term, with $\sqrt{(1 - R^2)} = \sqrt{(1 - 0.362)} = 0.799$.

The strong, significant, independent effect of physical activity on adolescent physical health found in this study is well aligned with the broader literature. Regular exercise and physical activity have repeatedly been linked to improved physical fitness, healthy weight maintenance, and reduced risk of chronic disease among adolescents and young adults (Fan et al., 2026; Hallal et al., 2006; Bratina et al., 2011), and structured physical activity support has shown measurable benefits for weight management specifically (Videira-Silva et al., 2018). The moderate effect size observed here (r = 0.578) is consistent

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with the view that physical activity is one of the most consistently documented, modifiable determinants of physical health during this life stage (Kumaran et al., 2026).

The absence of a significant association between the broader healthy-lifestyle measure and physical health is a more unexpected finding, given that healthy lifestyle behaviors, including diet, sleep, and substance avoidance, are generally reported to support better physical fitness, weight management, and long-term health in the literature (Burdette et al., 2017; González Moreno & Molero Jurado, 2024). One plausible explanation is that this study's lifestyle instrument combined multiple distinct behaviors, such as diet, sleep, and hygiene, into a single 10-item scale; because diet, exercise, and sleep do not always move together and can have distinct, sometimes competing, associations with health outcomes (Salas-González et al., 2025; Kosta & Kosta, 2025), a composite scale of this kind may average out or dilute effects that would appear more clearly if nutrition, sleep, and other lifestyle domains were measured and analyzed separately, as is more common in dedicated adolescent nutrition research (Evans & Docter, 2020; Parajuli & Prangthip, 2025).

It is also possible that the relatively small and homogeneous sample (n = 35, all aged 18-24) limited the statistical power available to detect a smaller true effect of healthy lifestyle once physical activity, itself part of a healthy lifestyle, was already included in the model; because the two predictor variables were essentially uncorrelated with each other (multicollinearity was negligible), the lifestyle measure's weak partial effect cannot be attributed to overlap with physical activity, but more plausibly reflects genuine measurement or sampling limitations. Family and institutional support has been shown to shape both physical activity and nutrition behavior jointly (Rodríguez-Torres et al., 2024), suggesting that future studies might more usefully model healthy lifestyle as several separate sub-constructs (e.g., diet quality, sleep, substance avoidance) rather than a single composite score.

Taken together, these findings suggest that in this sample, physical activity is the more robust and actionable predictor of adolescent physical health, while claims about a broader "healthy lifestyle" construct should be treated cautiously until measured with instruments that separate its component behaviors. This has a practical implication: health promotion efforts aimed at this age group may achieve more measurable results by prioritizing physical activity specifically, without abandoning broader lifestyle education, which remains theoretically and practically important even where this study's measure did not detect a statistically significant independent effect.

CONCLUSION

This study examined the effects of healthy lifestyle and physical activity on the physical health of 35 late adolescents and young adults aged 18-24. All research instruments satisfied the assumptions of linearity, normality, and the absence of multicollinearity. Physical activity was significantly correlated with physical health, while healthy lifestyle was not.

The multiple regression model was statistically significant and explained 36.2% of the variance in physical health. However, when the two predictors were analyzed jointly, only physical activity remained a significant independent predictor, contributing 33.1 percentage points of the explained variance compared with a non-significant 3.1 percentage points for healthy lifestyle. These findings indicate that physical activity is the dominant driver of physical health in this sample, and that the composite healthy-lifestyle measure used here requires further refinement, for example by separating diet, sleep, and substance-avoidance items into distinct sub-scales, before its independent contribution can be more confidently assessed. Future studies with larger and more diverse samples are recommended to confirm these patterns and to clarify the specific lifestyle components most closely tied to adolescent physical health.

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