The Influence of Health Awareness, Exercise Frequency, and Dietary Habits on University Students' Physical Well Being: Application of Ordinary Least Square Estimation

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ABSTRACT

Recently, there has been a growing emphasis on promoting physical well-being through improved health awareness, regular physical activity, and healthier dietary practices. Recognizing the critical association between physical health and academic success, universities have increasingly implemented wellness initiatives to support students' overall well-being. This study aims to examine the influence of exercise frequency, health awareness, and dietary habits on students' physical well-being. A total of 76 participants from a prominent higher education institution in Kelantan were surveyed using self-administered questionnaires. Data were analyzed using multiple linear regression and independent t-tests. Findings reveal that exercise frequency and dietary habits significantly affect students' physical well-being, whereas health awareness showed no significant influence. The study offers important insights for higher education administrators and policymakers in developing strategies to foster positive physical well-being among university students.

Keywords: Health Awareness, Exercise Frequency, Dietary Habits, Students, Physical Well Being

INTRODUCTION

Physical well-being is a critical determinant of university students' health, academic success, and overall quality of life. Prior research has identified physical fitness and Body Mass Index (BMI) as significant predictors of students' academic and personal performance (Jiang et. al., 2021). Recent advancements, such as the use of wearable technologies, have further enhanced students' ability to manage body weight and increase awareness of physical activity, contributing positively to overall well-being (Wang et. al., 2021). However, students continue to face difficulties in balancing academic responsibilities with sufficient rest, regular exercise, appropriate nutrition, and psychosocial needs (Lee & Loke, 2025). The growing prevalence of lifestyle-related diseases in the university-aged population underscores the importance of promoting regular physical activity as a means of fostering long-term health and resilience (Kljajević et. al., 2021; Saghafi-Asl et. al., 2020)

Health awareness is also a key factor influencing students' lifestyle behaviors and health outcomes. Elevated levels of health awareness are associated with improved health practices, including consistent exercise, balanced dietary habits, and proactive self-care, which contribute to better physical and mental health (Zhang et. al., 2021). Moreover, self-awareness plays a vital role in motivating students to take ownership of their well-being through a preventive approach to health management (Wagani et. al., 2021). Nonetheless, students often experience transitional health challenges, such as poor sleep quality and increased psychosocial stressors (Adam & Moore, 2007; Bulbotz et. al., 2001: Tsai & Li, 2004). The demands of a "24-hour society" (Gosta, 2021) and sedentary behaviors particularly in technology, intensive fields, further highlight the need for integrated health education and physical activity promotion (Li, 2024). Exercise frequency is widely recognized as essential for both physical and mental health, aiding in stress resilience and long-term fitness (Gumasing et. al., 2022; Xi, 2024). Despite technological advances that support exercise tracking, participation rates remain low, particularly among female students (Lee & Loke, 2005; Zhou et. al., 2021). Dietary patterns also significantly influence student health, with poor nutrition linked to mental health concerns and increased obesity risk due to excessive

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consumption of fast food and sugary beverages (Solomou et. al., 2024; Syed et. al., 2020). These trends suggest the need for structured interventions addressing both diet and exercise.

Despite ongoing initiatives, further research is necessary to understand how health awareness, exercise frequency, and dietary habits collectively affect students' physical well-being in diverse academic contexts. This study investigates these relationships among students in the Diploma in Mathematical Sciences program at UiTM Kelantan, Machang Branch. The outcomes aim to inform targeted strategies for improving student lifestyles, academic performance, and overall well-being within the university setting.

METHODOLOGY

Study Design, Sample and Instrumentation

This study uses a non-experimental, correlational research design, which observes and analyzes the relationship between variables without any manipulation. It aims to examine how health awareness, exercise frequency, and dietary habits affect physical well-being among university students. Data were collected through a self-administered questionnaire shared via Google Forms. The target population includes around 360 students from the Department of Mathematical Sciences at Universiti Teknologi MARA (UiTM), Kelantan Branch, Machang Campus. Stratified random sampling was used to ensure a balanced representation across different student groups. Using Raosoft software, the minimum sample size was set at 76, and a 25-item questionnaire was developed to gather the required information.

Similarly, another study applied a cross-sectional, quantitative approach to explore how social support, academic pressure, and financial stress affect mental health among students. Data were gathered through a self-administered questionnaire, with 76 students from the same campus selected using simple random sampling. The questionnaire had two sections: Part A focused on demographic details, and Part B included questions on psychological health, social support, academic pressure, and financial stress, with responses rated on a five-point Likert scale from Strongly Agree to Strongly Disagree. A summary of the questionnaire items and sources is provided in Table 1.

Table 1: Instrumentation

Variable	Source	Scale
Demographic		Multiple-choice questions
Physical well-being Exercise frequency Dietary Habits	(Wang et. al., 2020)	Likert scale from 1 (strongly disagree) to 7 (strongly agree)
Health awareness	(Gould 1988)	

Study Framework

The study framework is illustrated in Figure 1, with physical well-being as the dependent variable, while physical well-being, exercise frequency, dietary habits are the independent variables.

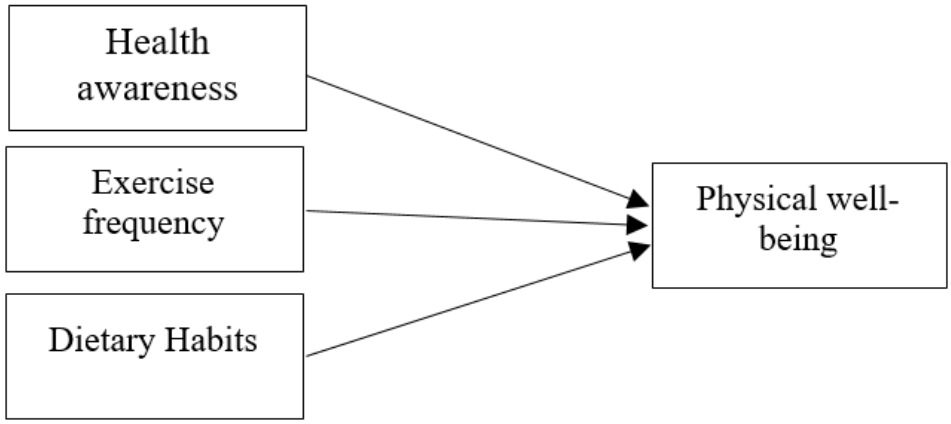

Figure 1: Conceptual Framework

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Method of Analyis

Before conducting the analysis, data screening was performed to address missing values, remove duplicate responses, and identify outliers. The quantitative data were standardized to ensure compatibility for statistical analysis. Both descriptive and inferential statistical methods were used in the data analysis.

Descriptive statistics were employed to outline the demographic profiles of the respondents. Multiple Linear Regression (MLR) was used to to assess the impact of exercise frequency, health awareness, and dietary habits on physical well-being. MLR helps to understand how changes in the independent variables are associated with changes in the dependent variable. The general formula for Multiple Linear Regression is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \in \qquad (1)$$

Where, Y is the dependent variable, β_0 is the y-intercept (constant term), $\beta_1, \beta_1, \ldots, \beta_k$ are the coefficients of the independent variables of $X_1, X_2, \ldots, X_k$. $\in$ is the error term or residual, representing the difference between the observed and predicted values of Y. MLR estimates the coefficients (β values) that minimize the sum of the squared differences between the observed and predicted values of the dependent variable.

The Ordinary Least Squares (OLS) method is commonly used to estimate the parameters in Multiple Linear Regression (MLR). The OLS method uses matrix algebra to simplify the estimation process. Represent the model in matrix form:

$$Y = X\beta + \epsilon \qquad (2)$$

Where, Y is $n \times 1$ vector of dependent variable values. X is an $n \times (k+1)$ matrix of independent variables (including a column of ones for the intercept). β is a $(k+1) \times 1$ vector of parameters and ϵ is an $n \times 1$ vector of errors. The OLS estimate of the parameter vector β is obtained using the formula:

$$\hat{\beta} = (X^T X)^{-1} X^T Y \qquad (3)$$

Where, X^T is the transpose matrix of X and $(X^T X)^{-1}$ is the inverse of the matrix $X^T X$.

FINDINGS

Demographics of respondent

Table 2 presents the demographic characteristics of the respondents. The majority were female (51.2%), while males accounted for 48.8%. In terms of age distribution, most respondents were 19 years old (37.5%), followed by those aged 18 (32.5%) and 20 (30%). Regarding academic level, the highest proportion of students were in Part 3 (37.5%), followed by Part 1 (32.5%) and Part 5 (30%). A significant majority (96.3%) reported a CGPA between 3.0 and 4.0, while only 3.8% had a CGPA between 2.0 and 3.0. Finally, with respect to residency status, 67.5% of students were residents, and 32.5% were non-residents.

Table 2: Demographic Profile of respondents

Characteristic	Category	Percentage (%)	Frequency
Gender	Female	51.2	39
	Male	48.8	41
Age	18 years	32.5	26
	19 years	37.5	30
	20 years	30.0	24
Academic Level	Part 1	32.5	26
	Part 3	37.5	30
	Part 5	30.0	24
CGPA	3.0 – 4.0	96.3	3
	2.0 – 3.0	3.8	77

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Residency Status	Resident	67.5	26
	Non-resident	32.5	54

Model Adequacy Checking

Model adequacy checks include the assumption of linearity between independent and dependent variables, normality of residuals, homoscedasticity, and multicollinearity [18-20].

Linearity

Table 3 presents the Pearson correlation analysis results for the relationship between Physical Well-Being and three variables. Health Awareness exhibits a strong positive linear relationship with Physical Well-Being, with a Pearson correlation coefficient of 0.643. Likewise, Exercise Frequency shows a similarly strong positive linear relationship, with a Pearson correlation coefficient of 0.730. Dietary Habit also demonstrates a strong positive linear relationship with Physical Well-Being, with a Pearson correlation coefficient of 0.691. All correlations are statistically significant, as indicated by a p-value of 0.000, suggesting a robust association among all variables.

Table 3: Pearson Correlation Analysis

Dependent variable	Independent variable	Pearson correlation	p-value
Physical Well-being	Health awareness	0.643	<0.05
	Exersice frequency	0.730	<0.05
	Dietary habits	0.691	<0.05

Homoscedasticity

Figure 2 presents a scatter plot of residuals versus predicted values, with the data points appearing to be randomly distributed. This randomness indicates consistent variance in the residuals, confirming that the assumption of homoscedasticity is satisfied.

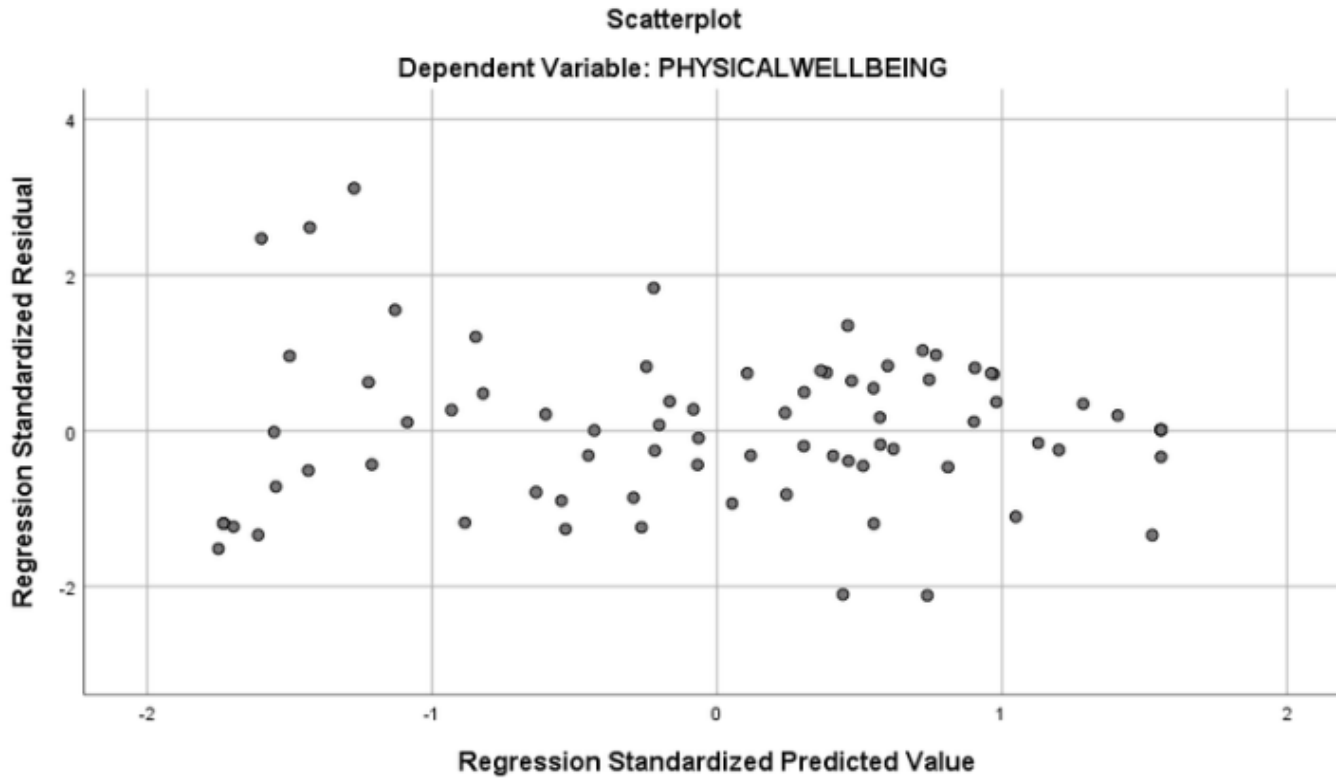

Figure 2: The Scatter Plot of Residual by Predicted Value

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Normality

Figure 3 shows that the data points closely follow a straight line, indicating that the residuals are approximately normally distributed. This observation supports a key assumption of Multiple Linear Regression, thereby strengthening the validity of the model.

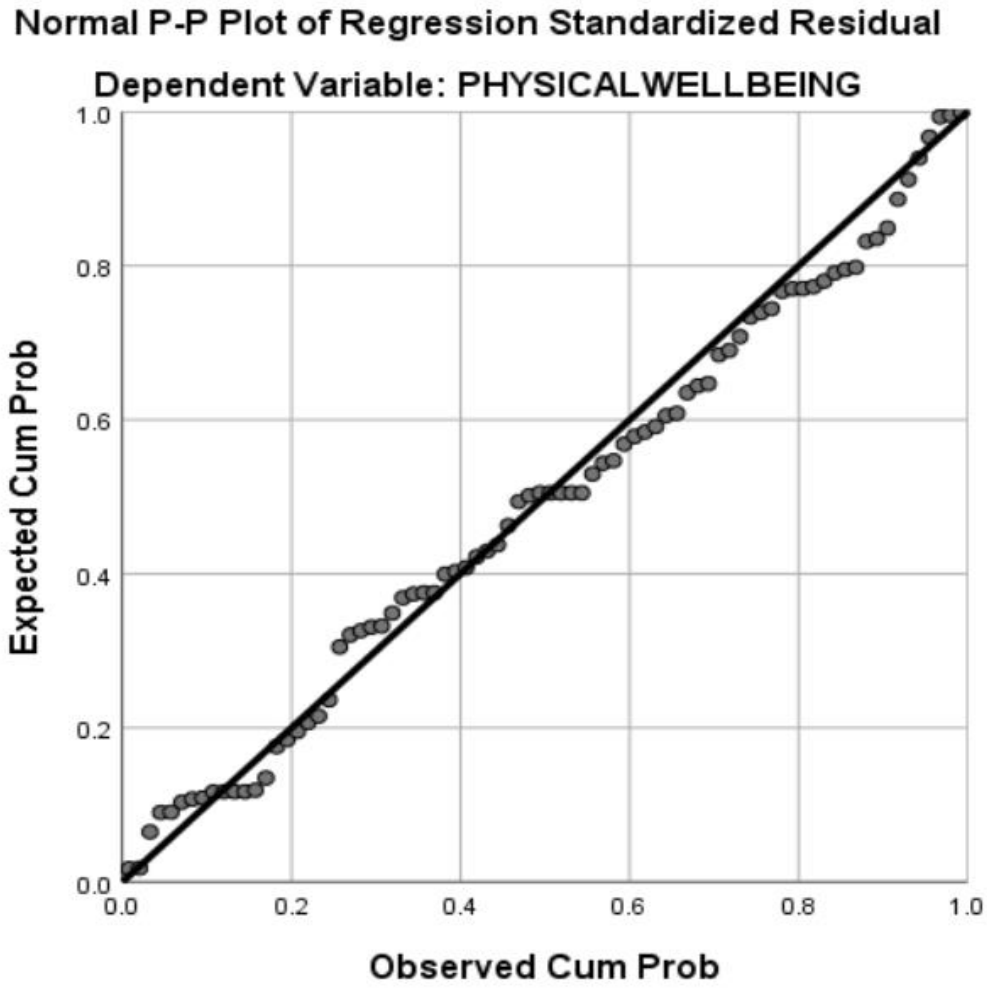

Figure 3: Normal Probability of Residual

Multicollinearity

Table 4 presents the Tolerance and Variance Inflation Factor (VIF) values for each variable. The Tolerance values for Health Awareness, Exercise Frequency, and Dietary Habits are 0.399, 0.440, and 0.420, respectively, all of which exceed the threshold of 0.1. Similarly, the VIF values for these variables are 2.507, 2.272, and 2.383, respectively, all of which are well below the threshold of 10. These results suggest that multicollinearity is not a concern among the variables.

Table 4: Multicollinearity Test

Variables	Collinearity Statistics		Findings
	TOL	VIF	
Health awareness	0.399	2.507	
Exersice frequency	0.440	2.272	No Multicollinearity
Dietary habits	0.420	2.383	

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Significant of model

Table 5 shows that the regression model is highly significant (F = 39.124, p = 0.000), with an R^2 value of 0.607. This indicates that 60.7% of the variation in the dependent variable (physical well-being) is explained by the predictors (health awareness, exercise frequency, and dietary habits).

Table 5: Analysis of Variance for MLR test

Model	ANOVA	F	Sig	R Square
1	Regression	39.124	<0.05	0.607

Significant of independent variable

Table 6 presents the results of the regression analysis, where the significance of each independent variable is assessed using a t-test. Variables with p-values less than 0.05 are considered significant, indicating a meaningful contribution to the dependent variable. Exercise frequency ($\beta = 0.382$, $p < 0.05$) and dietary habits ($\beta = 0.281$, $p < 0.05$) have a significant impact on students' physical well-being, while health awareness ($\beta = 0.2106$, $p = 0.334$) does not show a significant effect.

Table 6: Final Result

Variable	Beta	t-statistics	95% confidence level		Significant
			Lower Bound	Upper Bound	
Constant	1.607	3.805	0.766	2.449	<0.05
Health awareness	0.106	0.971	-0.112	0.325	0.334
Exersice frequency	0.382	4.054	0.194	0.569	<0.05
Dietary habits	0.281	2.803	0.081	0.481	0.006

Summary of The Findings

The results of the entire study are summarized in Table 7.

Table 7: Summary of The Findings

Relationships	Findings
There is a significant influence of health awareness on students' physical well-being	Not Supported
There is a significant influence of exersice frequency on students' physical well-being	Supported
There is a significant influence of dietary habits on students' physical well-being	Supported

CONCLUSION

In conclusion, the findings of this study underscore the significant impact of exercise frequency and dietary habits on the physical well-being of university students. While health awareness is often considered a cornerstone of well-being promotion, the results indicate that awareness alone does not significantly influence physical health outcomes. This suggests that tangible lifestyle behaviors, such as engaging in regular physical activity and maintaining a nutritious diet, play a more direct role in enhancing students' physical well-being than simply being informed about health matters.

These insights are particularly valuable for higher education institutions aiming to support student wellness in a more practical and results-oriented manner. By focusing resources on programs that encourage active participation in fitness and healthy eating, universities can create more effective wellness initiatives. The study's implications call for a shift from awareness-based campaigns to behavior-focused interventions that promote sustainable health practices, ultimately contributing to better academic performance and overall student success.

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