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Econometrics Analysis of Economic Factor Affecting Student Academic Performance Using Correlation and Regression Analysis

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Abstract

This study investigates the relationship between students' daily feeding times and physical fitness, specifically body weight, using econometric tools such as correlation and regression analysis in a university context. The research aimed to explore the economic and behavioral factors underlying students' daily eating habits and their potential impact on physical fitness. A sample of 21 students from the Faculty of Science was selected, and data on gender, daily feeding times, and weight were collected. Descriptive statistics, Pearson correlation, and simple linear regression were employed to analyze the data. The results revealed a weak positive correlation between daily feeding time and weight ($r = 0.417$), indicating no statistically significant relationship, and the regression model showed that only 13% of the variance in students' weight could be explained by their daily feeding habits. These findings suggest that, within this sample, daily feeding time alone is not a major determinant of physical fitness as measured by body weight. The study concludes that there is no significant link between students' daily feeding times and their physical

fitness and recommends that future research consider broader nutritional patterns, meal frequency, and psychosocial factors such as physical and mental stress to better understand and support healthy weight maintenance among university students.

Keywords: Daily Feeding Time; Student Nutrition; Body Weight; Correlation and Regression Analysis; University Students.

Introduction

Econometrics deals with the measurement of economic relationships. It is an integration of economics, mathematical economics and statistics with an objective to provide numerical values to the parameters of economic relationships. The relationships of economic theories are usually expressed in mathematical forms and combined with empirical economics. The econometrics methods are used to obtain the values of parameters which are essentially the coefficients of the mathematical form of the economic relationships.

The statistical methods which help in explaining the economic phenomenon are adapted as econometric methods. The econometric relationships depict the random behavior of economic relationships which are generally not considered in economics and mathematical formulations. It may be pointed out that the econometric methods can be used in other areas like engineering sciences, biological sciences, medical sciences, geosciences, agricultural sciences etc. In simple words, whenever there is a need of finding the stochastic relationship in mathematical format, the econometric methods and tools help. The econometric tools are helpful in explaining the relationships among variables.

A model is a simplified representation of a real-world process. It should be representative in the sense that it should contain the salient features of the phenomena under study. In general, one of the objectives in modeling is to have a simple model to explain a complex phenomenon. Such an objective may sometimes lead to oversimplified model and sometimes the assumptions made are unrealistic. In practice, generally, all the variables which the experimenter thinks are relevant to explain the phenomenon are included in the model. Rest of the variables are dumped in a basket called "disturbances" where the disturbances are random variables.

This is the main difference between economic modeling and econometric modeling. This is also the main difference between mathematical modeling and statistical modeling. The mathematical modeling is exact in nature, whereas the statistical modeling contains a stochastic term also. An economic model is a set of assumptions that describes the behavior of an economy, or more generally, a phenomenon. Weight loss can be achieved through a variety of modalities, but long term maintenance of lost weight is much more challenging. Obesity interventions typically result in early rapid weight loss followed by a weight plateau and progressive regain. This review describes our current understanding of the biological, behavioral, and environmental factors driving this near ubiquitous body weight trajectory and the implications for long term weight management. Treatment of obesity requires ongoing clinical attention and weight maintenance specific counseling to support sustainable healthful behaviors and positive weight regulation.

Substantial weight loss is possible across a range of treatment modalities, but long term sustenance of lost weight is much more challenging, and weight regain is typical Love man E, Frampton GK, Shepherd J, etal (2011).

In a meta-analysis of 29 long term weight loss studies, more than half of the lost weight was regained within two years, and by five years more than 80% of lost weight was regained Anderson JW, Konz EC, Frederic RC, et al (2001). Indeed, previous failed attempts at achieving durable weight loss may have contributed to the recent decrease in the percentage of people with obesity who are trying to lose weight and many now believe that weight loss is a futile endeavor Mann T, Tomiyama AJ, Westling E, Lew AM, Samuels B, Chatman J. (2007).

Here, we describe our current understanding of the factors contributing to weight gain, physiological responses that resist weight loss, behavioral correlates of successful maintenance of lost weight, as well as the implications and recommendations for long term clinical management of patients with obesity. Long term weight management is extremely challenging due to interactions between our biology, behavior, and the obesogenic environment. The rise in obesity prevalence over the past several decades has been mirrored by industrialization of the food system. Stuckler D, McKee M, Ebrahim S, Basu S. (2012). Involving increased production and marketing of inexpensive, highly processed foods with supernormal appetitive properties Swinburn BA, Sacks G, Hall KD, et al. (2011)Ultraprocessed foods now contribute the majority of calories consumed in America

Martinez Steele E, Baraldi LG, Louzada ML, Moubarac JC, Mozaffarian D, Monteiro CA. (2016) and their overconsumption has been implicated as a causative factor in weight gain Mendonca RD, Pimenta AM, Gea A, et al.(2016) Such foods are typically more calorically dense and far less healthy than unprocessed foods such as fruits, vegetables, and fish Kahan S, Cheskin LJ (2014). Food has progressively become cheaper. Putnam J. (2000), fewer people prepare meals at home Lin BH, Guthrie J (2012) and more food is consumed in restaurants, Putnam J. (2000) In addition, changes in the physical activity environment have made it more challenging to be active throughout the day. Occupations have become more sedentary. Church TS, Thomas DM, TudorLocke C, et al. (2011) and suburban sprawl necessitates vehicular transportation rather than walking to work or school as had been common in the past. Taken together, changes in the food and physical activity environments tend to drive individuals towards increased intake, decreased activity, and ultimately weight gain. Church TS, Thomas DM, TudorLocke C, et al. (2011).

We now know that the simple calculations underlying the old weight loss guidelines are fatally flawed because they fail to consider declining energy expenditure with weight loss Rosenbaum M, Hirsch J, Gallagher DA, Leibel RL. (2008). More realistic calculations of expected weight loss for a given change in energy intake or physical activity are provided by a webbased tool called NIH Body Weight Planner (http://BWplanner.niddk.nih.gov) that uses a mathematical model to account for dynamic changes in human energy balance. Hall KD, Sacks G, Chandramohan D, et al. (2011).

In addition to adaptations in energy expenditure with weight loss, body weight is regulated by negative feedback circuits that influence food intake. Greenway FL. (2015). Weight loss is accompanied by persistent endocrine adaptations. Sumithran P, Prendergast LA, Delbridge E, et al. (2011) that increase appetite and decrease satiety thereby resisting continued weight loss and conspiring against long term weight maintenance.

Statement of the Problem

The relationship between students' daily feeding times and their physical fitness, particularly weight, remains unclear, despite its potential implications for students' overall health and academic performance. In university environments, students often experience irregular eating habits due to academic pressures and lifestyle changes, which may influence their physical fitness outcomes. This study seeks to investigate whether there is a significant link between the timing of students' daily meals and their weight, using econometric

methods such as correlation and regression analysis. Understanding this relationship is crucial for developing strategies to improve students' health and well-being, as weight management plays a vital role in preventing obesity and other related health issues.

Aim and Objectives of the Study

The aim of this study is to investigate the relationship between students' daily feeding times and their physical fitness, specifically weight, in order to understand the economic factors influencing students' eating habits and their impact on physical fitness in a university environment.

1. To examine the correlation between students' daily feeding times and their physical fitness (weight).

2. To determine the extent to which daily feeding habits contribute to the variance in students' weight using regression analysis.

3. To assess whether the timing of meals has a significant impact on students' weight management and overall physical fitness.

4. To provide recommendations on improving students' feeding habits to support better physical fitness and weight maintenance.

Literature Review

Robert Dent •Ruth McPherson •Mary-Ellen Harper (2020) Current obesity treatment strategies include diet, exercise, bariatric surgery, and a limited but growing repertoire of medications. Individual weight loss in response to each of these strategies is highly variable. Here we review research into factors potentially contributing to inter-individual variability in response to treatments for obesity, with a focus on studies in humans. Well recognized factors associated with weight loss capacity include diet adherence, physical activity, sex, age, and specific medications. However, following control for each of these, differences in weight loss appear to persist in response to behavioral, pharmacological and surgical interventions. Adaptation to energy deficit involves complex feedback mechanisms, and inter-individual differences likely to arise from a host of poorly defined genetic factors, as well as differential responses in neurohormonal mechanisms (including gastrointestinal peptides), metabolic efficiency and capacity of tissues, non-exercise activity thermogenesis, thermogenic response to food, and in gut microbiome. A better understanding of the factors involved in inter individual variability in response to

therapies will guide more personalized approaches to the treatment of obesity.

Obesity becomes the major public health problem worldwide and unhealthy lifestyles are the most risk factors of it. People wrongly perceive central obesity as an indicator of wealth group in western Ethiopian; however it is a midfielder for cardio-metabolism disorders. Thus, study aimed to assess the prevalence of overweight, obesity and associated factors among middle aged urban residents of west Ethiopia.

A community based cross sectional study was applied. Data was collected from 266 participants as of world health organization approach in February 2019. Statistical package for social science version 24 was used to analyze. Descriptive statistical analysis was reported with frequency, percentage and mean ± standard division. A binary logistic analysis resulting with $P < 0.25$ candidate to multivariable and significant association was considered at p-value ≤ 0.05.

The prevalence of overweight, obesity and its combined index was 19.5%, 24.4% and 43.9% respectively.

Based on Ethiopian references for waist circumference, about 58.6% adults were at risk of developing central obesity.

The mean and standard division of twelve food groups was 5.4 ± 1.9. On binary analysis, being raised (systolic blood pressure; $P = 0.034$, diastolic blood pressure; $P = 0.090$, fasting blood sugar; $P = 0.013$), and high dietary diversity score ($P = 0.038$) were associated with central obesity.

On multivariate analysis being: Raised triglycerides ($P < 0.001$); elevated diastolic blood pressure ($P = 0.047$) and high dietary diversity score (AOR = 1.52; 95% CI: 1.12-2.25) were associated with central obesity, but dietary diversity was not significant ($P = 0.379$). Both general and central obesity was highly prevalent and associated significantly with independent variables. Consequently, age targeted Nutrition education needs attention to reduce the prevalence and complications from obesity related diseases.

Methodology

This research employed a quantitative method approach for data gathering. The researcher was conducted around the school environment faculty of Science. A sample of 21 students was collected with their various necessary information like; Gender, Daily

timing feeding and Weight.

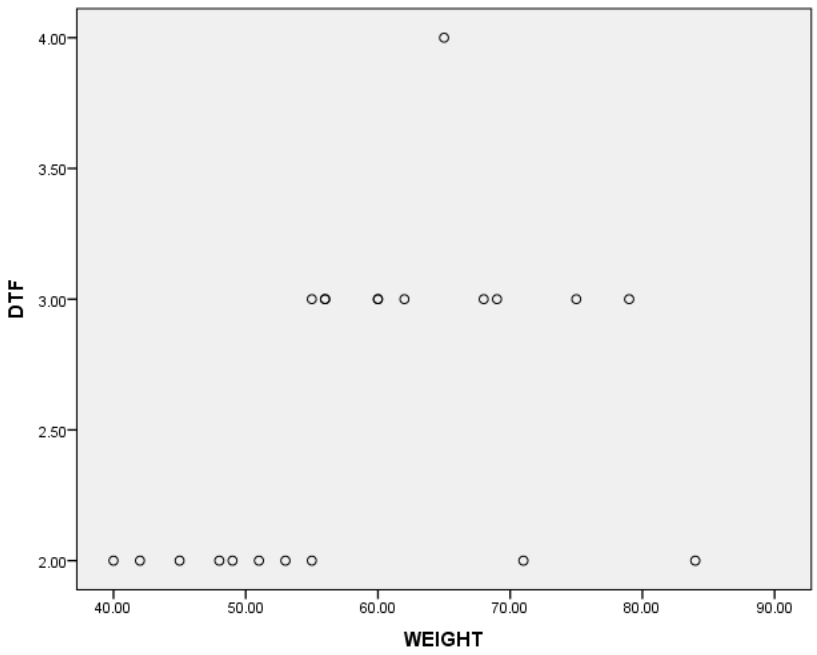
Most previous studies that seek to explain Econometrics analysis on factors affecting student's daily timing feeding and their physical fitness (weight) using correlational analysis.

Data Analysis

Different statistical methods from IBM Statistical Package for the Social Sciences (SPSS) PC version 23 x86 bit was used to analyze satisfaction data and students weight data.

These methods include descriptive statistics, correlation and linear regression summary analysis.

Descriptive statistics, e.g., means and standard deviation of student responses are often applied to detect the most and the last satisfaction items regarding college programs and services (Dam-minger, 2001). The correlation analysis and linear regression method is useful tool to analyze the relationship between explanatory variable and students weight results. Linear regression allows the researcher to identify explanatory variable related to student's weight and how it contributes to the overall university satisfactory (Thomas and Galamos 2002). This method also permitted the researchers to estimate the magnitude of the effect of the explanatory variables on the outcome variable. Therefore, regression method seem to be superior in studying the relationship between the explanatory and outcome variables.



Graph 1: Simple scatter plot showing relationship between Factors affecting student's daily timing feeding and their physical fitness (weight)

Interpretation: From the above scatter plot, since the point are all scattered, its shows that is no Significant relationship between the student's daily timing feeding and their physical fitness (weight)

Table 1: Showing the correlation between the student's daily timing feeding and their physical fitness (weight)

Correlations

		Y	X
Y	Pearson Correlation	1	.417
	Sig. (2-tailed)		.060
	N	21	21
X	Pearson Correlation	.417	1
	Sig. (2-tailed)	.060	
	N	21	21

Interpretation: From the table above the result shows that correlation is very weak positive relationship, which means that there is no significant relationship between the student's daily timing feeding and their physical fitness (weight)

Table 2: Showing the summary of regression

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.417[a]	.174	.131	11.16863
a. Predictors: (Constant), DTF				

Interpretation: Table 2 shows that the **Adjusted R^2** Which indicates the percentage of variance in the student's daily timing feeding and their physical fitness (weight)

Individual Differences 13% of the variance in the student's daily timing feeding and their physical fitness (weight).

Table 3: Showing coefficient of regression

Coefficients[a]				
Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta		
37.693	11.019		3.421	.003
8.360	4.179	.417	2.001	.060
a. Dependent Variable: X				

Interpretation: Table 3: Showing the regression fitting model value of the student's daily timing feeding and their physical fitness (weight).

Discussion

The research was carried out investigate the economical factor affecting the student's daily timing feeding and their physical fitness (weight). It was hypothesized to check the the student's daily timing feeding and their physical fitness (weight). Econometrics tools such as correlation and regression analysis were used to check the economic factors affecting the student's daily timing feeding and their physical fitness (weight) as the independent and dependent variable respectively. Scatter plot was also used in checking if there is relationship between the student's daily timing feeding and their physical fitness (weight).

Conclusion

From the result, the Pearson correlation is 0.417, it indicates that the relationship is very weak or there is no correlation. In the same analysis, the two tailed significant value (0.060) was found to be above 0.05, indicating that there is no significant relationship between the student's daily timing feeding and their physical fitness (weight). That means the economic factor; the student daily timing feeding has an effect on the physical fitness of the student since from all indications for correlation regression analysis and scatter plot is shows that there is no relationship.

Recommendations

The following recommendation are;

1. Parents should increase students with foodstuffs to enable full concentration on their studies.

2. Students should try increase the frequency of their daily food ration to at least three (3) times a day, to help them maintain/increase weight.

3. Students should limit their daily activities so that it will help them not to lose weight.

4. Students should reduce any kind of unnecessary worries/ thinking so that it will help them not to lose weight.

5. Students should observe siesta time that to help them relax and regain strength not to lose weight.

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