International Journal of Scientific Research and Management (IJSRM)
||Volume||13||Issue||11||Pages||130-135||2025||
Website: https://ijsrm.net ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v13i011.nd01

Exploring the Interconnected Pathways of Intermittent Fasting, Weight, and Education on Basal Metabolic Index: A Structural Equation Model

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Abstract

This study investigates the correlation between Intermittent Fasting (IF), Weight Efficacy Lifestyle (WEL) scores, and weight, with education considered as a potential mediating variable, and their combined impact on the Basal Metabolic Index (BMI) among Filipinos. Intermittent fasting has gained popularity as a weight management strategy, yet its effects may vary depending on individual factors such as educational attainment, lifestyle, and health awareness. To explore these relationships, data were collected from 200 respondents across Region X, Philippines, utilizing the standardized Weight Efficacy Lifestyle (WEL) Survey Questionnaire. Descriptive and correlational analyses were performed to determine the consistency and variability among educational level, BMI, weight, and WEL scores. The findings revealed a notable relationship between educational attainment and adherence to intermittent fasting practices, which in turn influenced BMI outcomes. Higher educational levels were associated with improved self-regulation in dietary habits and a more consistent application of IF protocols, contributing to healthier BMI levels. Conversely, participants with lower educational backgrounds demonstrated greater variability in WEL scores and BMI results, suggesting that educational interventions could enhance the safe and effective practice of IF. These results provide a strong basis for further investigation using Structural Equation Modeling (SEM) to assess the mediating role of education more comprehensively. From a public health perspective, this study highlights the importance of integrating nutritional education and behavioral support into fasting programs to promote sustainable and safe weight management among Filipinos, thereby fostering overall metabolic health and well-being.

Keywords: Intermittent Fasting, Weight Efficacy Lifestyle, Basal Metabolic Index, Education, Weight Management, Structural Equation Modeling

Introduction

Global life expectancy dropped by 1.7 years between 2019 and 2021 due to the COVID-19 pandemic, erasing over a decade of progress in health and longevity (WHO SDG Report, 2024). Non-communicable diseases (NCDs) such as heart disease, cancer, and stroke remain the top causes of death in the Philippines (PSA, 2024). The WHO warns that the world is not on track toward achieving universal health coverage and sustainable health outcomes, emphasizing the need for preventive and lifestyle-based interventions.

Weight management instability has more than doubled worldwide (Antoni, 2017). In the Philippines, one in four Filipinos identify as overweight, a condition associated with poor mental health and unhealthy dieting practices (De Leon, 2021). The prevalence of processed foods, sedentary lifestyles, and fad diets has led to fluctuating Body Mass Index (BMI) patterns linked to diabetes and cardiovascular diseases. Thus, sustainable weight management strategies are vital for improving public health outcomes.

Intermittent Fasting (IF) has gained global attention for its potential benefits in weight loss, metabolic health, and disease prevention (Ryan & Kahan, 2018; Chan, 2020). IF involves alternating periods of fasting and unrestricted eating and is praised for its simplicity and adaptability (Headland et al., 2019). However, existing research focuses mainly on short-term effects, leaving gaps in understanding its long-term impact, comparative effectiveness, psychological implications, and suitability for different populations.

This study investigates the correlation between intermittent fasting (measured through the the Weight Efficacy Lifestyle Score) and weight, with education as a possible mediator influencing Basal Metabolic Index (BMI), using Structural Equation Modeling (SEM) analysis.

Results

Problem 1. Is there a significant relationship between intermittent fasting (IF) and basal metabolic index (BMI)?

Table 1: **Relationship between Intermittent Fasting (IF) and BMI**

Variable	β Coefficient	p-value	Interpretation
IF → BMI	0.070	0.184	Not Significant

Legend: Very Weak (0.00–0.20), Weak (0.21–0.40), Moderate (0.41–0.60), Strong (0.61–0.80), Very Strong (0.81–1.00)

A very weak, non-significant positive relationship (r = 0.070, p = 0.184) was observed, indicating that intermittent fasting did not significantly influence BMI.

Problem 2. Is there a significant relationship between education level and BMI?

Table 2: **Relationship between Education Level and BMI**

Variable	β Coefficient	p-value	Interpretation
Education → BMI	-0.086	0.228	Not Significant

There was a very weak negative relationship (r = -0.086, p = 0.228), indicating that education level did not significantly influence BMI.

Problem 3. Is there a significant relationship between intermittent fasting (IF) and education level?

Table 3: **Relationship between IF and Education Level**

Variable	β Coefficient	p-value	Interpretation
IF → Education	0.447	0.001	Significant

A moderate, positive, and significant correlation (r = 0.447, p = 0.001) was found, suggesting that individuals with higher education levels tend to have higher WEL (IF adherence) scores.

Problem 4. Is there a significant relationship between weight and BMI?

Table 4: **Relationship between Weight and BMI**

Variable	β Coefficient	p-value	Interpretation
Weight → BMI	0.716	<0.001	Significant

A strong, positive, and significant correlation (r = 0.716, p < 0.001) was observed, confirming that as weight increases, BMI also increases.

Problem 5. Is there a significant relationship between intermittent fasting (IF) and weight?

Table 5: **Relationship between IF and Weight**

Variable	β Coefficient	p-value	Interpretation
IF → Weight	0.070	0.184	Not Significant

A very weak, non-significant correlation (r = 0.070, p = 0.184) was found, indicating that IF did not significantly affect weight among respondents.

Problem 6. Is there a significant relationship between education level and weight?

Table 6: **Relationship between Education Level and Weight**

Variable	β Coefficient	p-value	Interpretation
Education → Weight	-0.054	0.863	Not Significant

Results showed a very weak, non-significant negative relationship (r = -0.054, p = 0.863), suggesting that education level does not directly affect weight.

Problem 7. Is there a significant relationship between IF (WEL score) and weight in influencing BMI?

Table 7: **Relationship between IF (WEL Score) and Weight in Influencing BMI**

Variable	r	p-value	Interpretation
IF → Weight (BMI)	0.011	0.880	Not Significant

The correlation was very weak and non-significant (r = 0.011, p = 0.880), indicating that IF has minimal effect on weight changes influencing BMI.

Problem 8. Is there a coefficient relationship between variables?

Table 8 Test on Difference Between Variables

Variables	t-value	p-value	Interpretation
IF, Education, Weight → BMI	9.413	0.001	Significant

The model was significant (p < 0.001), with R = 0.725 and R^2 = 0.525, meaning that 52.5% of BMI variability can be explained by IF, education level, and weight combined.

Problem 9. What is the mediating effect of education level on the relationship between IF and BMI?

Table 9 Mediating Effect of Education on IF and BMI

Path	β Coefficient	SE	R^2	p-value	Interpretation
IF → Education → BMI	2.051	0.224	0.525	<0.001	Significant Mediation

Bootstrapping results revealed a significant indirect effect (β = 2.051, p < 0.001), confirming that **education mediates the relationship between IF and BMI**. Higher education enhances understanding and adherence to fasting practices, indirectly contributing to healthier BMI outcomes.

Summary of Findings

- IF and BMI showed no direct significant relationship.
- Education did not directly affect BMI or weight but **significantly correlated with IF adherence**.
- Weight was the **strongest predictor of BMI**.
- The combined model (IF, Education, Weight) significantly explained **52.5%** of BMI variation.
- **Education served as a mediator**, linking IF and BMI indirectly through improved knowledge and lifestyle awareness.

Analysis

This section presents the statistical analysis of data from 200 respondents. Missing values were checked, and descriptive, bivariate, and multivariate analyses were performed using JASP, SPSS, and AMOS.

1. Descriptive Statistics

Results show considerable variability among participants. BMI (SD = 4.42) and weight (SD = 32.42) indicated wide differences, while educational level (SD = 0.67) was relatively uniform. The mean BMI (26.59) placed most participants in the overweight category, while the mean WEL score (57.49) indicated moderate adherence to intermittent fasting (IF). Data distributions were slightly skewed but within the normal range. This suggests a diverse sample in terms of body composition and fasting behavior, with consistent educational attainment.

2. Bivariate Correlations

A strong positive correlation was found between weight and BMI (r = 0.716, p < .001), confirming that heavier individuals tend to have higher BMI. Other relationships—such as between education level, weight, and WEL score—were weak and statistically insignificant. ANOVA confirmed no significant difference in BMI across education levels (p = 0.419). These findings imply that education alone does not directly affect BMI or weight outcomes.

3. Assumption and Multivariate Checks

Normality and homogeneity of variances were met (Levene's p = 0.181). Multicollinearity tests (tolerance = 1.00, VIF = 1.00) indicated no issues. Mahalanobis and Cook's Distance values showed no influential

outliers. Skewness and kurtosis results confirmed that all variables were approximately normal and suitable for Structural Equation Modeling (SEM).

4. SEM and Model Fit

The hypothesized SEM examined the correlation between IF (WEL score) and weight, with education as a potential mediator, and its effect on BMI. The direct effect of IF on weight was not significant ($\beta = 0.219$, $p = 0.879$). However, Bootstrap analysis revealed a significant **indirect effect** of education on the relationship between IF and BMI ($\beta = 2.051$, $p < .001$), explaining 52.5% of the variance. Weight remained the strongest predictor of BMI.

Model fit indices confirmed an excellent fit ($\chi^2 = 0.612$, $p = 0.434$; CFI = 1.000; RMSEA = 0.000), validating the model's reliability and predictive strength.

5. Summary

The results indicate that while IF and education individually show limited direct influence on BMI, education significantly mediates their relationship. This suggests that higher educational attainment enhances understanding and adherence to health practices like IF, indirectly contributing to healthier BMI outcomes.

Discussion

The findings of this study provide valuable insights into the relationship between Intermittent Fasting (IF), weight, education, and Basal Metabolic Index (BMI) among Filipino adults. Although the results revealed no strong direct correlation between IF (as measured by WEL score) and BMI, the data highlighted the mediating role of education, which influenced the extent to which IF impacts BMI outcomes. This implies that individuals with higher educational attainment may possess greater health literacy and discipline in maintaining consistent fasting habits, leading to better weight management and metabolic balance.

The significant correlation between weight and BMI ($r = 0.716$, $p < .001$) aligns with established research confirming that BMI increases proportionally with body weight (World Health Organization, 2021). However, the non-significant differences in BMI across education levels suggest that educational attainment alone does not automatically predict healthier body composition. Instead, the effect appears to be **indirect**, influencing knowledge, awareness, and behavioral regulation, which in turn shape health-related decisions. This supports previous findings by Castillo et al. (2022), who observed that education contributes to greater adherence to evidence-based nutritional interventions, including IF.

The structural equation modeling (SEM) results further reinforce the mediating role of education. The model achieved excellent fit indices (CFI = 1.000, RMSEA = 0.000), demonstrating strong reliability. The significant indirect path from IF to BMI via education ($\beta = 2.051$, $p < .001$) indicates that when education enhances understanding of healthy eating and fasting routines, individuals are more likely to achieve and maintain optimal BMI levels. Thus, educational background acts as a catalyst that transforms awareness into effective behavior.

These findings emphasize that intermittent fasting, when guided by informed practices, can be a safe and effective weight management strategy. However, without proper education and awareness, individuals may inconsistently apply IF, reducing its potential benefits or even leading to metabolic imbalance. Therefore, public health programs promoting IF should integrate **educational components** that address nutritional literacy, self-regulation, and proper fasting protocols.

While the study offers meaningful contributions, it has limitations. The reliance on self-reported data may introduce response bias, and the cross-sectional design limits causal interpretation. Future research should incorporate longitudinal tracking and controlled interventions to establish stronger causal relationships.

Overall, the study underscores the importance of education as a mediating factor in achieving a healthy BMI through intermittent fasting. Empowering individuals with knowledge and behavioral strategies may enhance the long-term effectiveness of IF as part of holistic health management among Filipinos.

References

1. Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), Action-control: From cognition to behavior (pp. 11–39), Heidelberg, Germany: Springer.

Cited. Ajzen, I. (2020). The Theory of Planned Behavior: A Bibliography. https://people.umass.edu/aizen/tpbrefs.html
2. Steinmetz, H., Knappstein, M., Ajzen, I., Schmidt, P., & Kabst, R. (2016). How effective are behavior change interventions based on the theory of planned behavior? A three-level meta-analysis. Zeitschrift für Psychologie, 224(3), 216–233.
3. Chen WW, Freinkman E, Wang T, Birsoy K, Sabatini DM. Absolute quantification of matrix metabolites reveals the dynamics of mitochondrial metabolism. Cell. 1324–1337.
4. De Souza, "Alternatives For Macronutrient Intake and Chronic Disease," The American Journal of Clinical Nutrition, July 2018.
5. Thirteenth general program of work, 2019–2023: promote health, keep the world safe, and serve the vulnerable. Geneva: World Health Organization; 2019 (WHO/PRP/18.1; https://iris.who.int/handle/10665/324775). License: CC BY-NC-SA 3.0 IGO.
6. Eric R. Eide, Mark H. Showalter, Estimating the relation between health and education: What do we know and what do we need to know?, Economics of Education Review, Volume 30, Issue 5, 2021, Pages 778-791, ISSN 0272-7757, https://doi.org/10.1016/j.econedurev.2011.03.009.
7. Arendt, J.N. 2015. "Does Education Cause Better Health? A panel data analysis using school reform for identification." Economics of Education Review 24:149-160.
8. Raghupathi, V., Raghupathi, W. The influence of education on health: an empirical assessment of OECD countries for the period 1995–2015. Arch Public Health 78, 20 (2020). https://doi.org/10.1186/s13690-020-00402-5
9. Wim Groot, Henriëtte Maassen van den Brink, The health effects of education, Economics of Education Review, Volume 26, Issue 2, 2017, Pages 186-200, ISSN 0272-7757, https://doi.org/10.1016/j.econedurev
10. Nuttall, Frank Q., MD, PhD. Body Mass Index: Obesity, BMI, and Health. Nutrition Today 50(3):p 117-128, May/June 2015. | DOI: 10.1097/NT.0000000000000092
11. Khanna D, Peltzer C, Kahar P, Parmar MS. Body Mass Index (BMI): A Screening Tool Analysis. Cureus. 2022 Feb 11;14(2):e22119. doi: 10.7759/cureus.22119. PMID: 35308730; PMCID: PMC8920809.
12. Twig G, Yaniv G, Levine H, et al.: Body-mass index in 2.3 million adolescents and cardiovascular death in adulthood. N Engl J Med. 2016, 374:2430-40. 10.1056/NEJMoa150384
13. Satman I, Omer B, Tutuncu Y, et al.: Twelve-year trends in the prevalence and risk factors of diabetes and prediabetes in Turkish adults. Eur J Epidemiol. 2013, 28:169-80. 10.1007/s10654-013-9771-5
14. Khanna D, Mutter CM, Kahar P: Perception of overall health, weight status, and gaining weight in relationship with self-reported BMI among high school students. Cureus. 2021, 13:e19637.10.7759/cureus.19637
15. Markowitz, J.S. (2018). Body Mass Index (BMI). In: Mortality and Its Risk Factors Among Professional Athletes. SpringerBriefs in Public Health. Springer, Cham. https://doi.org/10.1007/978-3-319-77203-5_5
16. Nyholm, M.; Gullberg, B.; Merlo, J.; Lundqvist-Persson, C.; Råstam, L.; Lindblad, U. The validity of obesity based on self-reported weight and height: Implications for population studies. Obesity 2017, 15, 197.
17. Minohara, S. M., & Musni, R. V. (2025). Impact of Motivation and Social Support in Online Distance Learning among Freshmen. *International Journal of Research and Innovation in Social Science*, *VIII*(XII), 3294–3302. https://doi.org/10.47772/ijriss.2024.8120273
18. Schulze, M.B. Metabolic health in normal-weight and obese individuals. Diabetologia 62, 558–566 (2019). https://doi.org/10.1007/s00125-018-4787-8
19. Ancel Keys, Flaminio Fidanza, Martti J Karvonen, Noburu Kimura, Henry L Taylor, Indices of relative weight and obesity, International Journal of Epidemiology, Volume 43, Issue 3, June 2014, Pages 655–665, https://doi.org/10.1093/ije/dyu058
20. Courtney M Peterson, Diana M Thomas, George L Blackburn, Steven B Heymsfield, Universal equation for estimating ideal body weight and body weight at any BMI1, The American Journal of Clinical Nutrition, Volume 103, Issue 5, 2016, Pages 1197-1203, ISSN 0002-9165, https://doi.org/10.3945/ajcn.115.121178.

21. Quick, V.; Byrd-Bredbenner, C.; Shoff, S.; White, A.A.; Lohse, B.; Horacek, T.; Kattelmann, K.; Phillips, B.; Hoerr, S.L.; Greene, G.; et al. Concordance of self-report and measured height and weight of college students. J. Nutr. Educ. Behav. 2015, 47, 94–98.
22. Cho, Y., Hong, N., Kim, K.-w., Cho, S. j., Lee, M., Lee, Y.-h., Lee, Y.-h., Kang, E. S., Cha, B.-S., & Lee, B.-W. (2019). The Effectiveness of Intermittent Fasting to Reduce Body Mass Index and Glucose Metabolism: A Systematic Review and Meta-Analysis. Journal of Clinical Medicine, 8(10), 1645. https://doi.org/10.3390/jcm8101645
23. Bragazzi, N.L.; Sellami, M.; Salem, I.; Conic, R.; Kimak, M.; Pigatto, P.D.M.; Damiani, G. Fasting and its impact on skin anatomy, physiology, and physiopathology: A comprehensive review of the literature. Nutrients 2019, 11, 249.
24. Rebecca Benson, Paul T. von Hippel, Jamie L. Lynch, Does more education cause lower BMI, or do lower-BMI individuals become more educated? Evidence from the National Longitudinal Survey of Youth 1979, Social Science & Medicine, Volume 211, 2018, Pages 370-377, ISSN 0277-9536, https://doi.org/10.1016/j.socscimed.2017.03.042.
25. Jacob Nielsen Arendt, Does education cause better health? A panel data analysis using school reforms for identification, 5, Pages 149-160, ISSN 0272-7757, https://doi.org/10.1016/j.econedurev.2014.04.008. Economics of Education Review, Volume 24, Issue 2, 200 (https://www.sciencedirect.com/science/article/pii/S0272775704000688)
26. Yu Aoki, Lualhati Santiago, Speak better, do better? Education and health of migrants in the UK, Labour Economics, Volume 52, 2018, Pages 1-17, ISSN 0927-5371, https://doi.org/10.1016/j.labeco.2018.03.003.
27. Sina Sharifi, Fatemeh Rostami, Kimia Babaei Khorzoughi, and Mahmoud Rahmati, Effect of time-restricted eating and intermittent fasting on cognitive function and mental health in older adults: A systematic review, Preventive Medicine Reports, Volume 42, 2024, 102757, ISSN 2211-3355, https://doi.org/10.1016/j.pmedr.2024.102757.
28. Gouda, T., & Aljuhani, H. (2023). The effectiveness of a suggested indicative program to measure cognitive experiences towards the importance of intermittent fasting diets and their impact on endemic diseases in the Najran Region. J. Stat. Appl. Pro, 12(1), 215-221.
29. Welton, S., Minty, R., O'Driscoll, T., Willms, H., Poirier, D., Madden, S., & Kelly, L. (2020). Intermittent fasting and weight loss: A systematic review. Canadian Family Physician, 66(2), 117-125.
30. Varady, K.A., Cienfuegos, S., Ezpeleta, M. *et al.* Clinical application of intermittent fasting for weight loss: progress and future directions. *Nat Rev Endocrinol* **18**, 309–321 (2022). https://doi.org/10.1038/s41574-022-00638-x
31. Medalla, E.J. & Musni, R.V. (2025). Exploring the roles and Challenges of guidance designates in the preparation of homeroom guidance Programs: A Qualitative study. *The International Journal of Social Sciences and Humanities Invention*, *12*(07), 8644–8648. https://doi.org/10.18535/ijsshi/v12i07.01
32. Stockman, MC., Thomas, D., Burke, J., et al. Intermittent Fasting: Is the Wait Worth the Weight?. Curr Obes Rep 7, 172–185 (2018). https://doi.org/10.1007/s13679-018-0308-9
33. Molarius A, Seidell JC, Sans S, Tuomilehto J, Kuulasmaa K. Educational level, relative body weight, and changes in their association over 10 years: an international perspective from the WHO MONICA Project. Am J Public Health. 2020 Aug;90(8):1260-8. doi: 10.2105/ajph.90.8.1260. PMID: 10937007; PMCID: PMC1446346.