HIGH GLYCEMIC FOOD CONSUMPTION AND NUTRITIONAL STATUS AMONG ADOLESCENTS IN ABBOTTABAD, PAKISTAN

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ABSTRACT

OBJECTIVES

The study aimed to investigate the correlation between high glycemic food consumption and nutritional status among adolescent students in government and private schools.

METHODOLOGY

A cross-sectional study was conducted over 6 months on 350 adolescent students aged 14 to 19 years studying in government and private schools, selected through simple random sampling in Abbottabad between January 2025 and June 2025. Nutritional status was assessed through selective anthropometric measurements, while glycemic loads were calculated using standard parameters from a food frequency questionnaire (FFQ). SPSS 26 version was used for descriptive and inferential analysis

RESULTS

Among 350 students of 14 to 19 years included (53%) male and (47%) female students of Govt School (53.8%) and Private school (46.2%) students,205 girls participated in the study. Results show that the minimum weight of the participants was 41 kg, with a maximum of 84 kg and a mean of 57.25 kg. The minimum height was 132 cm, and the maximum was 185 cm, with a mean of 162.97 cm. Waist circumference was minimum 65 cm and maximum 95 cm, with a mean of 76 cm, and (σ) was 6.69. Hip circumference was minimum 78.5 cm and maximum 100 cm, with a mean of 86.46 cm, and (σ) was 4.41. Waist/Hip ratio was minimum 0.76 cm and maximum 0.97 with a mean of .88, and (σ) was. 055. Glycemic load was 94, with a minimum and maximum of 168, with 120.42 mean and a standard deviation (σ) of 13.15. Z scores were 1.67, the minimum and maximum were 2.74, and the standard deviation (σ) was 10.0. Z-scores and Glycemic loads also showed a correlation with p-values of 0.5. However, with a p-value of 0.02, a robust correlation was found between the waist-hip ratio and Glycemic loads of foods. Additionally, p-values of 0.03 with a correlation coefficient of 0.2 and p-values of 0.00 in a 2-tailed test showed a strong correlation.

CONCLUSION

A high frequency of SSI was observed following primary closure in enteric perforation. Neither age nor gender was significantly associated with SSI, indicating that other factors, such as contamination level, surgical technique, and perioperative management, may play a more critical role. Consideration of delayed primary closure and strict infection-control measures may help reduce SSI in these high-risk cases.

KEYWORDS: *Anthropometric Measurements, Circumference, Correlation, FFQ (Food Frequency Questionnaire, Glycemic Loads*

INTRODUCTION

The glycemic load (GL) of food is an important dietary concept that combines both the glycemic index (GI) and the carbohydrate content of food to estimate how much a food will raise a person's blood glucose level.[1] In the context of adolescents, understanding the relationship between glycemic load and anthropometric measurements (such as BMI, weight, waist circumference, body fat %, etc.) is increasingly important due to the rising rates of childhood and adolescent obesity, type 2 diabetes, and other metabolic disorders.[2] High-GL foods cause rapid glucose spikes followed by insulin surges and eventual hypoglycemia, leading to increased hunger and overeating.[3] Insulin and Fat Storage: Insulin promotes fat storage; frequent spikes in insulin levels may contribute to increased body fat.[4] Chronic high-GL diets may induce low-grade inflammation, promoting adipose tissue, and may influence hormones such as leptin and Ghrelin that regulate appetite.[5] Cardiovascular diseases, cancer, and other health problems, such as age-related macular degeneration.[6] Several pieces of evidence regarding the effects of dietary GL on diabetes, obesity, and hypertension in adolescents have been noted.[7] The comparison of a low-glycemic-load diet showed neutral effects on obesity in adulthood; observational studies have reported controversial findings among children.[8] Waist circumference (WC), Body mass index (BMI), and body fat were evaluated in the mentioned studies.[9] Some studies have focused on a single meal, examining appetite, satiety, food intake, and energy intake.[10]

METHODOLOGY

A cross-sectional study was conducted among 350 students from the 14-year to 19-year age group with no apparent metabolic disorders in selected Government and private schools of Abbottabad. Ethical Approval was taken from the institution having reference:R/AIMC/14/2025, dated: 2nd January 2025. Students were selected through simple random sampling, including both girls and boys. Students below 13 years of age and those above 19 Years of age, as well as those with apparent metabolic disorders, were excluded. To conduct this research, different study tools were used, including FFQs, Anthropometric measurements (such as weight, Height, BMI, and waist circumference), and a survey questionnaire. The research primarily focused on observing the dietary habits of the students in relation to the glycemic loads of the foods consumed by the study population.[11] The specified FFQ was used to measure the grams of different foods consumed, and the standard Glycemic index of the consumed foods was used to calculate the glycemic loads of the foods. GL (Glycemic Load) = Glycemic Index x Grams (food consumed)/100. Z-scores of the values were calculated by the formula Z= X-u/ô. SPSS version 26 was used for statistical analysis.

RESULTS

A study was carried out on 350 students, including adolescent age students between 14 and 19 years, which included (54%) male and (46%) female students. This study includes students from government schools (55%) and private schools (45%). Findings were based on Nutritional measurements, including anthropometric measurements, nutritional behavior, and Glycemic consumption of food. Table 1 shows that the minimum weight of the participants was 41 kg, the maximum was 84 kg, and the mean was 57.25 kg. Waist/Hip ratio was minimum 0.76 cm and maximum 0.97, with a standard deviation of 0.05. The Maximum Glycemic load was 168 with a standard deviation (σ). Maximum Z scores were 2.74, with a 1.54 mean and a standard deviation (σ) of 1.00. The table shows the. Correlation of the different variables with *p* values and 2-tailed Pearson correlation. There is a positive correlation with significant p-values of 0.05 between weight and Glycemic loads; likewise, Z-scores and Glycemic loads also show correlations with p-values of 0.05. There is a robust correlation between waist-hip ratio and Glycemic loads of foods, with a p-value of 0.03.

Table 1: Demographics of the participants

Descriptive statistics	Minimum	Maximum	Mean	Std. Deviation
Weight of the participants (Kg)	41 Kg	84 Kg	57Kg	3.7
Waist-Hip Ratio of the participants	0.76	0.97	0.88	2.1
Glycemic load of the participants	94.00	168.00	120.42	2.2
Z Scores	1.06	2.74	1.54	1.00

Table 2: Correlation of the Demographic DATA to Nutritional DATA

		Glycemic Load	Z Scores	Daily caloric count	Waist-Hip Ratio	Weight (Kg)
Glycemic Load	Pearson Correlation	-	+0.6	+0.7	+0.3	+0.6
	Sig. (2-tailed)	-	0.00	0.00	0.00	0.00
Z Scores	Pearson Correlation	+0.6	+1	+1	+0.5	+1.0
	Sig. (2-tailed)	0.00	-	0.00	0.00	0.00
Daily caloric count	Pearson Correlation	+0.8	+0.6	+1	0.0	+0.6
	Sig. (2-tailed)	0.00	0.00	-	0.00	0.00
Waist-Hip Ratio	Pearson Correlation	+0.5	+0.5	+0.35	+1	+0.5
	Sig. (2-tailed)	0.00	0.00	0.00	-	0.00
Weight (Kg)	Pearson Correlation	+0.6	+0.8	+0.6	+0.5	+1
	Sig. (2-tailed)	0.00	0.00	0.00	0.00	-

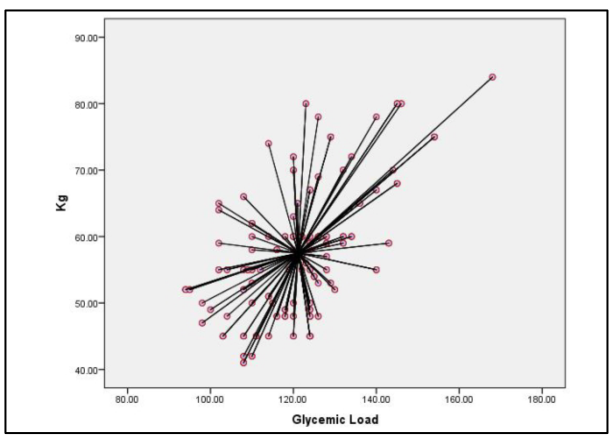

Figure 1: Shows a Strong Positive Correlation between Glycemic Load and the Weights of the Study Population

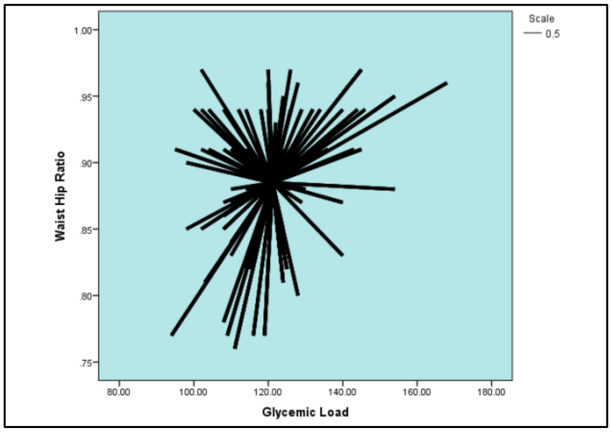

Figure 2: Shows a Strong Correlation between Glycemic Load and the Waist/Hip Ratio

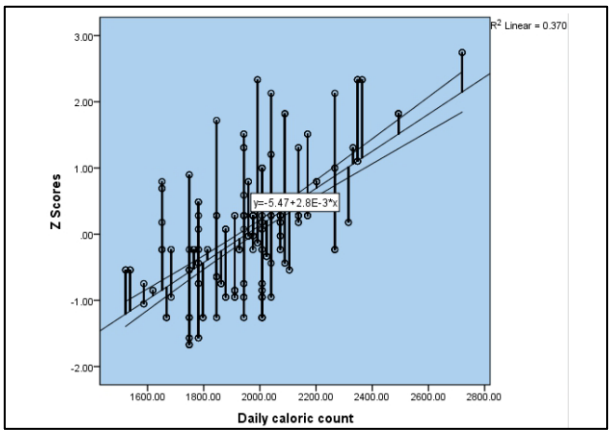

Figure 3: Glycemic Load with Daily Caloric Count

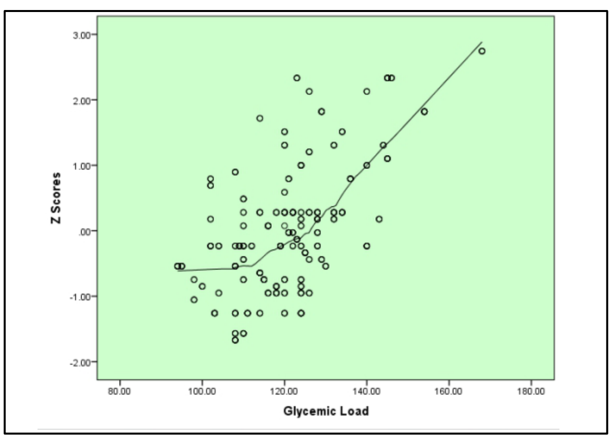

Figure 4: Glycemic Load with Z Scores

DISCUSSION

Study shows a positive correlation with significant *P* values 0.00 with Gender and weight, Glycemic loads, and Z scores show a strong correlation with p values < 0.05. A study by Murakami et al.[9] (2011) focused on a food frequency questionnaire designed to assess daily food intake. Nutrient profiles gathered from the FFQ were compared with those obtained from a self-report assessment form compiled after every meal.[12] In this study, regression analysis and correlation coefficients were calculated using the data obtained from the food frequency questionnaire and the self-report forms.[13] Correlation coefficients ranged from 0.23 to 0.91, with 85% of the values exceeding 0.50 and 55% exceeding 0.71, as noted in the study by Previa et al.[14] A study by Queiro et al does not support an effect of GL on weight change. The positive and significant association between GL and subsequent gain in waist circumference may imply a beneficial role of lower GI diets in preventing abdominal obesity. An Italian study in both genders also showed a positive association between GL and BMI. However, data from subpopulations of a Danish cohort presented a different picture from that presented in the Italian study.[15] There was a positive association between GL and BMI in sedentary Danish women, with the more remarkable association likewise in school-age children in Hong Kong, Latino teens, Danish girls under 16 years old, and Danish boys under 10 years, However, in Danish boys 10-16 years old, observed positive association between GL and skin fold measures of fatness.[16] Numerous studies confirm that weight loss can occur in the short term (less than 6 months) when dietitians employ a low-glycemic index (low GI) strategy compared to other diet strategies. However, in strictly controlled calories, the GL of the diet makes no difference.[17] Such findings were affirmed in a Cochrane review. Mean BMI lowered from the lowest to the highest tertile of Gl by 26.59 to 26.18 kg/m² in men (p ~ 0.03), and by 24.71 to 25.69 kg/m² in women (p < 0.001).[18] A recent randomized trial of 330 individuals with obesity (mean BMI = 36) in a dieting situation with intensive behavioral interventions showed that a reduced-carbohydrate, low-glycemic index diet achieved the same weight loss over 2 years.[19] Based on the findings, it can be assumed that overweight/obese adolescents from public schools were more responsive to the study recruitment and more homogeneously interested in being evaluated. In a study conducted by Smith et al., Waist circumference and waist-to-hip ratio were the strongest predictors of BMI (p = 0.001). Over one-third of the participants were overweight.[20]

LIMITATIONS

This study is limited to adolescent-age students, whose dietary habits are often disrupted by their busy schedules.

CONCLUSIONS

High glycemic loads of food consumed in the adolescent age group result in a deranged nutritional status and weight gain. Additionally, other parameters, such as waist circumference and waist-to-hip ratios, are affected by the consumption of high-glycemic foods in adolescent age groups.

CONFLICT OF INTEREST: None

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AUTHORS CONTRIBUTION

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.