Results

Descriptive Statistics

Introduction

Summary statistics were calculated for each interval and ratio variable. Frequencies and percentages were calculated for each nominal variable.

Frequencies and Percentages

The most frequently observed category of Sex was Male (*n* = 10, 55.56%). The most frequently observed categories of Age were 30-39, 40-49, 50-59, and 60+, each with an observed frequency of 4 (22.22%). Frequencies and percentages are presented in Table 1.

Table 1

Frequency Table for Nominal Variables

Variable	*n*	%
Sex		
Female	8	44.44
Male	10	55.56
Missing	0	0.00
Age		
20-29	2	11.11
30-39	4	22.22
40-49	4	22.22
50-59	4	22.22
60+	4	22.22
Missing	0	0.00

Note. Due to rounding errors, percentages may not equal 100%.

Summary Statistics

The observations for BMI_pre had an average of 25.33 (*SD* = 3.63, SE_M = 0.86, Min = 21.00, Max = 32.00, Skewness = 0.65, Kurtosis = -0.85). The observations for BMIPost had an average of 18.39 (*SD* = 1.97, SE_M = 0.47, Min = 15.00, Max = 21.00, Skewness = -0.23, Kurtosis = -1.06). The observations for BMI_6mo had an average of 19.56 (*SD* = 2.01, SE_M = 0.47, Min = 17.00, Max = 23.00, Skewness = 0.46, Kurtosis = -1.15). When the skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). The summary statistics can be found in Table 2.

Table 2

Summary Statistics Table for Interval and Ratio Variables

Variable	*M*	*SD*	*n*	SE_M	Min	Max	Skewness	Kurtosis
BMI_pre	25.33	3.63	18	0.86	21.00	32.00	0.65	-0.85
BMIPost	18.39	1.97	18	0.47	15.00	21.00	-0.23	-1.06
BMI_6mo	19.56	2.01	18	0.47	17.00	23.00	0.46	-1.15

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Two-Tailed Paired Samples *t*-Test

Introduction

A two-tailed paired samples *t*-test was conducted to examine whether the mean difference of BMI_pre and BMIPost was significantly different from zero.

Assumptions

Normality. A Shapiro-Wilk test was conducted to determine whether the differences in BMI_pre and BMIPost could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were not significant based on an alpha value of .05, $W = 0.94$, $p = .315$. This result suggests the possibility that the differences in BMI_pre and BMIPost were produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

Results

The result of the two-tailed paired samples *t*-test was significant based on an alpha value of .05, $t(17) = 7.93$, $p < .001$, indicating the null hypothesis can be rejected. This finding suggests the difference in the mean of BMI_pre and the mean of BMIPost was significantly different from zero. The mean of BMI_pre was significantly higher than the mean of BMIPost. The results are presented in Table 3. A bar plot of the means is presented in Figure 1.

Table 3

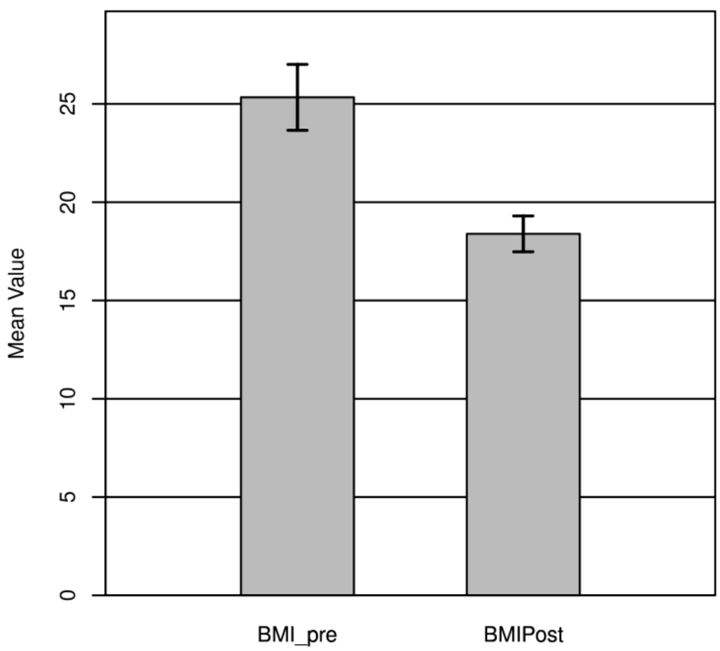
Two-Tailed Paired Samples t-Test for the Difference Between BMI_pre and BMIPost

BMI_pre		BMIPost				
M	*SD*	*M*	*SD*	*t*	*p*	*d*
25.33	3.63	18.39	1.97	7.93	< .001	1.87

Note. N = 18. Degrees of Freedom for the *t*-statistic = 17. *d* represents Cohen's *d*.

Figure 1

The means of BMI_pre and BMIPost with 95.00% CI Error Bars



Pearson Correlation Analysis

Introduction

A Pearson correlation analysis was conducted among BMI_pre, BMIPost, and BMI_6mo. Cohen's standard was used to evaluate the strength of the relationships, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size (Cohen, 1988).

Assumptions

Linearity. A Pearson correlation requires that the relationship between each pair of variables is linear (Conover & Iman, 1981). This assumption is violated if there is curvature among the points on the scatterplot between any pair of variables. Figure 2-Figure 3 presents the scatterplots of the correlations. A regression line has been added to assist the interpretation.

Figure 2

Scatterplots with the regression line added for BMI_pre and BMIPost (left), BMI_pre and BMI_6mo (right)

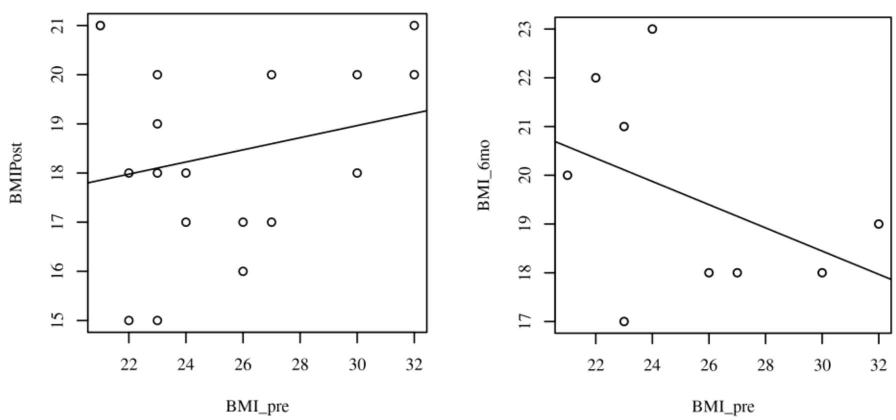
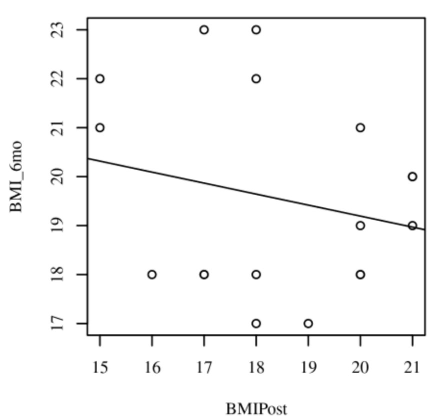


Figure 3

Scatterplots with the regression line added for BMIPost and BMI_6mo



Results

The result of the correlations was examined using the Holm correction to adjust for multiple comparisons based on an alpha value of .05. There were no significant correlations between any pairs of variables. Table 4 presents the results of the correlations.

Table 4

Pearson Correlation Results Among BMI_pre, BMIPost, and BMI_6mo

Combination	*r*	95.00% CI	*n*	*p*
BMI_pre-BMIPost	.23	[-.27, .63]	18	.730
BMI_pre-BMI_6mo	-.43	[-.75, .05]	18	.223
BMIPost-BMI_6mo	-.22	[-.62, .27]	18	.730

Note. *p*-values adjusted using the Holm correction.

Chi-square Test of Independence

Introduction

A Chi-square Test of Independence was conducted to examine whether Sex and BMI were independent. There were 2 levels in Sex: Female and Male. There were 2 levels in BMI: Normal and Overweight.

Assumptions

The assumption of adequate cell size was assessed, which requires all cells to have expected values greater than zero and 80% of cells to have expected values of at least five (McHugh, 2013). All cells had expected values greater than zero, indicating the first condition was met. A total of 25.00% of the cells had expected frequencies of at least five, indicating the second condition was violated. When the assumptions of the chi-square test are violated, Fisher's exact test can be used to produce more reliable results with small sample sizes. Logit models such as binary logistic regression can be used for larger sample sizes.

Results

The results of the Chi-square test were significant based on an alpha value of .05, $\chi^2(1) = 5.45$, $p = .020$, suggesting that Sex and BMI are related to one another. The following level combinations had observed values that were greater than their expected values: Sex

(Female):BMI (Normal) and Sex (Male):BMI (Overweight). The following level combinations had observed values that were less than their expected values: Sex (Male):BMI (Normal) and Sex (Female):BMI (Overweight). Table 5 presents the results of the Chi-square test.

Table 5

Observed and Expected Frequencies

	BMI				
Sex	Normal	Overweight	χ^2	*df*	*p*
Female	6[3.56]	2[4.44]	5.45	1	.020
Male	2[4.44]	8[5.56]			

Note. Values formatted as Observed[Expected].

References

Cohen, J. (1988). *Statistical power analysis for the behavior sciences* (2nd ed.). West Publishing Company.

Conover, W. J., & Iman, R. L. (1981). Rank transformations as a bridge between parametric and nonparametric statistics. *The American Statistician, 35*(3), 124-129. https://doi.org/10.1080/00031305.1981.10479327

Intellectus Statistics [Online computer software]. (2022). Intellectus Statistics. https://analyze.intellectusstatistics.com/

McHugh, M. L. (2013). The chi-square test of independence. *Biochemia Medica, 23*(2), 143-149. https://doi.org/10.11613/BM.2013.018

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics, 2*(1), 21-33.

Westfall, P. H., & Henning, K. S. S. (2013). *Texts in statistical science: Understanding advanced statistical methods.* Taylor & Francis.