The Combination Use of Semaglutide and Intermittent Fasting for Weight Loss

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Abstract

This DNP Capstone Project (DNP CP) addresses the pressing issue of obesity, which remains a global health crisis, particularly emphasizing its impact in the United States (US). Obesity has multifaceted implications, including physical health challenges and complex psychological and societal consequences. The primary objective of this study is to rigorously evaluate the effectiveness of combining semaglutide, an antihyperglycemic medication, with Intermittent Fasting (IF) as a novel approach to weight management in non-diabetic adults who have not responded to traditional weight loss methods. The study's findings indicate that semaglutide, individually and in combination with IF, is effective for short-term weight loss in this population. While the combination approach did not yield significantly superior results within the study's timeframe, further research is recommended to explore long-term effects and lifestyle integration post-medication. This study offers a potential avenue to optimize obesity management practices and contribute to combating the ongoing obesity epidemic.

Introduction

The escalating global health problem of obesity, particularly in developed countries like the US, necessitates comprehensive approaches to address both its physiological aspects and the psychological and societal barriers that individuals with obesity face (CDC, 2020; Tiwari & Balasundaram, 2023). Obesity is associated with mental health strains, discrimination, and stigma, affecting overall quality of life (Brown et al., 2022; Tiwari & Balasundaram, 2023). This DNP Capstone Project (DNP CP) aims

to evaluate the effectiveness of combining semaglutide with Intermittent Fasting (IF) as a novel strategy for weight management in non-diabetic adults who have not responded to traditional methods.

Objective

The primary objective of this DNP project is to evaluate the effectiveness of combining semaglutide with IF as a novel strategy for weight management in non-diabetic adults. This study aims to contribute to the clinical understanding of weight management and potential shifts in standard care practices for obesity in non-diabetic individuals.

Methods

This DNP study is structured within the PICOT framework, which stands for Population, Intervention, Comparison, Outcome, and Time (Melnyk & Fineout-Overholt, 2018). The study population comprises non-diabetic adult patients aged 18-64 with a Body Mass Index (BMI) of 25 to 39 who have not responded to conventional diet and exercise regimens. The intervention involves the off-label use of semaglutide for weight management in combination with IF, compared to the off-label use of semaglutide alone. The primary outcomes measured are percentage weight loss and BMI improvement over two months.

Detailed Methodology

This DNP CP, initially conducted at Restore Med Clinic in Newport Beach, California, and later at Serenite Wellness Medicine Clinic in Ontario, California, is a structured Quality Improvement Project (QIP) under the guidance of Dr. Heidi Regenass, MD. Utilizing the PICOT framework as the foundation for scientific investigation, this

study scrutinizes the off-label use of semaglutide, a GLP-1 receptor agonist, in combination with Intermittent Fasting (IF), and compares its effectiveness to the standard use of semaglutide alone for weight management (Eriksen & Frandsen, 2018). Approved by the South University Institutional Review Board on August 23, 2023, the project's design includes systematic recruitment of participants, pre-intervention and post-intervention data collection of weight and height, and subsequent data analysis. The QIP method encompasses four key components: a meticulous recruitment strategy, pre-test measurements, post-test measurements, and a comprehensive data analysis using both descriptive and analytical statistical techniques. The entire QIP process, spanning sixteen weeks, aims to draw meaningful and statistically significant conclusions regarding the efficacy of semaglutide when used in conjunction with IF for weight management (Vetter, 2017). The detailed examination of these components seeks not only to evaluate the immediate effectiveness of the interventions but also to contribute to the larger body of evidence-based practices in managing obesity. It underscores the significance of exploring innovative strategies to enhance patient outcomes in the persistent challenge of obesity and weight management in the healthcare field.

This study involves a participant pool from specific demographics, centering on non-diabetic adults who exhibit BMI ranging from 25 to 39 and who are intentionally chosen to provide valuable insights into the effectiveness of weight management strategies among individuals who are overweight or obese but not diabetic, thus filling a gap in existing research. This subset of the population often faces challenges with traditional weight management techniques, making them an ideal cohort for studying alternative interventions like semaglutide in combination with IF.

The study's methodological framework was carefully constructed to ensure a comprehensive and ethical approach to participant selection and data gathering. An in-depth review of clinical records from the collaborating institutions, Restore Med Clinic and Serenite Wellness Medicine Clinic, was conducted to identify potential study participants (Restore Med Clinic, 2023; Serenite Wellness Medicine, 2023). The inclusion criteria were rigorously defined to select individuals most likely to benefit from the intervention. In contrast, exclusion criteria were established to ensure the study sample's homogeneity and mitigate confounding variables. Such methodological rigor is crucial to ensuring the reliability and validity of the study's findings.

Data Collection and Analysis

The data collection process in this DNP project was structured to capture comprehensive and accurate data from participants. Data Collection Forms (DCFs) were employed as the primary instrument for gathering information, ensuring standardization and consistency across the participant spectrum. These forms were designed to record essential metrics such as weight, height, and BMI, both before and after the intervention phase. Participants were also provided with educational sessions to supplement the quantitative data. These sessions served a dual purpose: firstly, to inform participants about the details of the interventions they would be undergoing, and secondly, to enhance their engagement and comprehension, empowering them to be active contributors to the research process (Vetter, 2017; Cooksey, 2020).

The educational components were carefully constructed based on evidence-based guidelines and best practices in patient education. The intent was to ensure that

participants were knowledgeable about the procedures and potential effects of the interventions and felt included in the research journey, thus improving adherence to the intervention protocols.

Once the data were collected, a robust analysis plan was implemented. Descriptive statistics were used to delineate the collected data's central tendencies, dispersions, and overall distributions. These statistics were crucial for summarizing the data in a form that could be easily interpreted and understood, providing a snapshot of the data patterns that emerged from the interventions. Furthermore, inferential statistics were planned to probe deeper into the data, allowing for conclusions that extend beyond the sample to the general population. This inferential analysis was poised to provide a richer insight into the efficacy of the interventions and any potential impacts on the participants' weight management outcomes (Cooksey, 2020).

Clinical Setting and Ethical Considerations

The clinical setting for this DNP project encompasses two distinct yet collaborative clinical sites: Restore Med Clinic, a well-respected medical and surgical private practice in the affluent community of Newport Beach, California, and Serenite Wellness Medicine Clinic, a healthcare facility located in a predominantly middle class and an emerging upper-class community located in Ontario, California. The Newport Beach clinic's clientele primarily includes individuals from higher socio-economic backgrounds, while the Ontario clinic serves a broader demographic, offering a rich context for the study (Restore Med Clinic, 2023; Serenite Wellness Medicine, 2023).

Ethical considerations were paramount throughout the research process. The study was conducted in full compliance with the principles outlined by the Belmont Report, emphasizing respect for persons, beneficence, and justice. Each participant was treated with dignity and provided informed consent after clearly explaining the study's objectives, procedures, potential risks, and benefits. The informed consent process was designed to be comprehensive and easily understood, ensuring that participants were fully aware of their involvement and could make an informed decision about their participation (Colin & Gérard, 2022).

All information collected was coded with unique identifiers to maintain the confidentiality of participant data. The anonymity of the data was preserved during the analysis and reporting phases to protect the participants' privacy. This approach aligns with the ethical standards for protecting research subjects' identity and personal health information as stipulated by healthcare research guidelines (Melnyk & Fineout-Overholt, 2018). The South University Institutional Review Board approved the study, confirming that it met the necessary ethical standards for research involving human subjects. This approval underscores the ethical rigor with which the study was designed and conducted.

DNP CP QIP Question

The PICOT question underpinning this study is: "*In non-diabetic adult patients aged 18-64 with a BMI of 25 to 39 who have not responded to conventional diet and exercise regimens (P), how does the off-label use of semaglutide for weight management in combination with Intermittent Fasting or IF (I) compared to the off-label use of*

semaglutide alone (C) impact weight loss in terms of percentage weight loss and BMI improvement (O) over a 2-month period (T)?".

Data Preparation

This DNP CP adopts a Quality Improvement Project (QIP) format focusing on the seven (7) essential functions ranging from recruitment and consent to the accurate measurement of weight and height. All weight and height measurements were obtained using calibrated instruments at the clinic, following a standardized method to ensure uniformity and enhance reliability (National Heart, Lung, and Blood Institute, 2019). One of the challenges in this DNP project was the need for meticulous data collection over an extended period, where participants' weights were recorded before and after the introduction of both semaglutide and IF. There is a problem with the timing of data collection because several volunteer patients have different start times for semaglutide and IF treatments and administrations. As such, consistency in data collection is ensured by leveraging the IF Compliance Tracking Form and extracting data from medical records where necessary based on the appropriate timeline.

Coding and De-identifying the Data

Preparing the data is critical in a scientific study, especially when working with medical data, where strict ethical guidelines must be followed. Moreover, before any analysis is performed, the collected data must be cleaned, organized, and validated (Greiner & Knebel, 2023). Confidentiality and privacy are paramount for patient data study; specific procedures are established to achieve this goal.

The goal is to ensure data collection follows the Health Insurance Portability and Accountability Act (HIPAA). De-identifying personally identifiable information is essential to accomplish this goal (Theodos & Sittig, 2020). This process involves removing or replacing individual details like names, addresses, and social security numbers, ensuring that the data cannot be traced back to a specific individual. The study chose coding for this particular purpose. Coding is one approach that aids in data anonymization. Researchers assign each participant a unique code instead of directly using patient names or other identifiable data. These codes have no meaningful connection to the individual, thereby protecting their identity. The key linking the code to the identifiable information should be stored securely and separately from the coded data to prevent unintentional breaches of privacy (Rodriguez et al., 2022). In short, coding ensures that even if anecdotes or specific details are mentioned, they cannot be linked to the individual patient volunteer.

Procedures for Data Analysis

After data collection, the data was analyzed. Data analysis means cleaning, organizing, and subjecting the data to both descriptive and inferential statistical analysis (Guetterman, 2019). Descriptive Statistics (DS) summarizes the sample's central tendency, distribution, and spread (Cooksey, 2020). The next step is to delve into data analysis, ensuring that the correct statistical tests are applied to derive meaningful insights and build on the foundation of the data preparation process (Guetterman, 2019). Inferential Statistics (IS) followed DS and gave inferences for the before-and-after nature of the study. This DNP CP's primary aim was to compare pre-and post-intervention data. Various inferential tests were considered. A paired sample t-test may be an appropriate

inferential tool to determine if there is a statistically significant difference in weight loss and BMI improvement after applying interventions (Trafimow & MacDonald, 2017). Such a test is an ideal choice for dependent data, where the same subjects (i.e., the same patient volunteers) are being measured at two different times or under two conditions (Mishra et al., 2019), which is the case in this DNP CP study. This method allows us to identify if any observed differences are statistically significant, thereby providing empirical support for the intervention's efficacy.

However, it is crucial to ensure that the data meets the assumptions of the paired t-test. One of the key assumptions is that the differences between the paired observations should be approximately normally distributed (Mishra et al., 2019). The Central Limit Theorem (CLT) posits that the data can be considered customarily distributed if the sample size is more significant than 30 (Kwak & Kim, 2017; Sawada, 2021). If the sample size is below this threshold, it is advisable to conduct normality tests. Standard tests to verify this assumption include the Kolmogorov–Smirnov test and the Shapiro–Wilk test (Kwak & Kim, 2017; Sawada, 2021). If the data does not meet the normality assumption, it is imperative to consider non-parametric tests. For instance, the Wilcoxon sum rank test is a suitable option for paired data, and the Mann-Whitney U-test can be considered when comparing two independent groups (Kwak & Kim, 2017; Sawada, 2021). These non-parametric tests do not operate under the assumption of normality and can provide valid insights even when the data deviates from a normal distribution.

Results

Recent Literature Reviews (LRs) have indicated the effectiveness of semaglutide in weight management, with evidence supporting its role in reducing body weight in non-diabetic adults (Alabduljabbar et al., 2022; Colin & Gérard, 2022). Concurrently, IF has shown benefits to metabolic health, including improved blood glucose and cholesterol levels (Vasim et al., 2022). The data analysis within this project aims to synthesize findings from these studies to evaluate the combined impact of semaglutide and IF on weight loss and metabolic improvements. To analyze the effects of semaglutide and IF on weight loss and BMI in non-diabetic adults, the DNP data guided by the PICOT model was entered into the Statistical Package for the Social Sciences (SPSS) software.

Preliminary Data Testing and Results

Table 1: FINAL DATA COLLECTION
CODED Weight and BMI

Assigned DNP CP Code	Height	Start Date of Semaglutide onlyTreatment	Weight at start of Semaglutide only (lbs)	BMI at start of Semaglutide only Treatment	End Date of Semaglutide only= Start Date of IF+Semagalutide	Weight at end of Semaglutide only (lbs)	BMI at end of Semaglutide only	Weight at start of IF+Semaglutide (lbs)	BMI at start of Semaglutide+IF	End Date of IF+Semaglutide	Weight at end of IF +Semaglutide (lbs)	BMI at end of IF+Semaglutide
A1	5 ft 6 in	03132023	186	30	09112023	167	27	167	27	11062023	150	24
A2	5 ft 3 in	03132023	181	32	09112023	162	29	162	29	11062023	154	27
A3	6 ft 2 in	07142023	270	35	09112023	253	32	253	32	11062023	244	31
A4	5 ft 3 in	05312023	173	31	09112023	151	27	151	27	11062023	143	25
A5	5 ft 9 in	07032023	244	36	09112023	204	30	204	30	11062023	191	28
A6	5 ft 4 in	05192023	175	30	09112023	161	28	161	28	11062023	153	26
A7	4 ft 11 in	04032023	161	33	09112023	145	29	145	29	11062023	134	27
A8	5 ft 6 in	04/02/2023	190	31	09112023	172	28	172	28	11062023	164	26
C1	5 ft 3 in	03132023	139	25	09112023	113	20	113	20	11062023	105	19
C2	5 ft 2 in	04122023	200	37	09112023	173	32	173	32	11062023	161	29
C3	5 ft 6.5 in	04022023	192	31	09112023	186	30	186	30	11062023	173	28
C6	5 ft 6 in	04032023	203	33	09112023	185	30	185	30	11062023	171	28

Table 1 above details the coded raw data. The initial data analysis revealed that the total sample size comprised 13 patients. Box plots revealed at least three outliers in the data

(Appendix B). Case numbers 3 (A3), 9 (C1), and 12 (C4) are the outliers. Typically, three outliers are small. However, out of 13 sample sizes, it makes for about 25 %, which is a lot. One of the outliers, item 12 (C4), was a repetitive outlier. Observing the data revealed that the starting BMI of item 12 (C4) was 48 and violated the PICOT model, which stipulates a data set with BMI ranging only from 25 to 39. Therefore, item number 12 (C4) was removed. The remaining 12 items formed the total sample size for the current study. The data with the remaining 12 items was again analyzed using SPSS.

Final Data Testing and Results

At the final data stage, differences were observed between the mean and median values of the variables. The mean value of weight at the start of semaglutide only (192.83) was higher than its median value (188.00), and the mean value of BMI at the start of semaglutide only (32.00) was slightly higher than its media value (31.50). Similarly, the mean weight values at the end of semaglutide and the start of semaglutide and IF (172.67) were higher than the respective median values (169.50). Both variables had the same mean and median values. Weight at the end of semaglutide and IF (161.92) was higher than the median value (157.50).

On the other hand, the mean values for BMI at the end of semaglutide only and the start of semeglutide plus IF (28.50) were slightly lower than the respective median values (29.00). Both variables have similar mean and median values. The mean value of BMI at the end of semaglutide and IF (26.50) was also slightly lower than the corresponding media value (27.00).

The differences between mean and median values indicated the possibility of skewness and Kurtosis in the data distribution. Histograms with normality plots were drawn (Appendix A). The histograms also indicated skewness in some of the variables. Therefore, for a further test of the normality of the variables, the Shapiro-Wilk test was used with an alpha level of .05 and a

95% confidence interval. The test results showed that two variables, BMI at the end of semaglutide only (p=.015) and BMI at the start of semaglutide and IF (p=.015), are generally not normally distributed. The other six variables have $p \geq .05$ and are distributed normally.

The number of the sample was minimal, and two variables were not distributed normally. The normality assumption could be acceptable if the sample size is large. However, with a small sample size (less than 30), a paired sample t-test is unsuitable for skewed data distribution (Gravetter et al., 2021). With a small sample size, if the data is not normally distributed, the results of parametric statistics are misleading, and non-parametric statistical tests should be used (Pallant, 2020; Tabachnick et al., 2013). Therefore, instead of parametric statistics like paired sample t-tests, the Wilcoxon signed rank test is more suitable. The Wilcoxon signed-rank test is a non-parametric alternative to a paired sample t-test measuring differences between repeated measures where the same participants are measured twice (Pallant, 2020). Therefore, the Wilcoxon signed rank test for repeated measure was used separately to measure differences in weight and BMI before and after using semaglutide alone and before and after using semaglutide along with IF. The Wilcoxon signed rank test converts the continuous variables first into categories. Therefore, instead of mean values, the median values were reported for central tendency and standard deviation for dispersion, along with the Wilcoxon signed rank test results. Also, minimum, and maximum values were recorded to determine the data distribution range. SPSS does not produce results for effect size. The effect size was measured by dividing the Z value by the square root of N (Pallant, 2020).

Discussion

The results and findings of this DNP CP suggest that semaglutide, both individually and in combination with IF, is effective for short-term weight loss in non-diabetic adults. However,

the combination approach did not yield significantly superior results within the study's 2-month timeframe. This outcome challenges the presupposition that a combination approach would yield superior results and may suggest potential limitations in study duration or sample size. Future research is recommended to explore the long-term effects of semaglutide with dietary interventions such as IF, assess sustained weight management, and investigate psychological and behavioral aspects of patients transitioning to IF post-medication.

Descriptive Analysis

					Shapiro-Wilk	
	Md	SD	Min	Max	Statistic	Sig.
Weight at the start of Semaglutide only (lbs)	188	35.092	139	270	0.917	.264
Weight at the end of Semaglutide only (lbs)	169.50	34.169	113	253	0.933	.411
BMI at the start of Semaglutide only (lbs)	31.50	3.191	25	37	0.942	.521
BMI at the end of Semaglutide only (lbs)	29.00	3.148	20	32	.0.817	.015
Weight at the start of Semaglutide+IF (lbs)	169.50	34.169	113	253	.933	.411
Weight at the end of Semaglutide+IF (lbs)	157.50	33.649	105	244	.913	.235

BMI at the start of Semaglutide+IF (lbs)	29.00	3.148	20	32	.817	.015
BMI at the end of Semaglutide+IF (lbs)	27.00	3.000	19	31	.900	.158

n= 12; Alpha level for Shapiro-Wilk test α=0.05

The descriptive analysis was carried out for all eight instances where the variables of weight and BMI were measured before the start of administering semaglutide alone, at the end of semaglutide alone, at the start of administering semaglutide along with the IF, and at the end of the combined intervention. The data revealed variations in median values before and after the interventions. The median value of weight and BMI decreased after all the interventions.

The median weight value at the start of Semaglutide (188.00) is higher than that of weight at the start of IF (169.50). Similarly, the median value of BMI at the start of Semaglutide (31.50) is higher than BMI at the start of IF (29.00). The results for combining Semaglutide with IF also show variation over time. Weight at the start of semaglutide plus IF (169.50) is higher than that at the end of semaglutide and IF (157.50). Also, the BMI at the start of semaglutide combined with IF (29.00) is higher than the BMI at the end of the combination of semaglutide with IF (27.00).

The results of descriptive analysis showed substantial change in weight and BMI after semaglutide alone and in combination with IF. It is essential to measure the significance of these differences through inferential statistics to know the true nature of the change.

Inferential Statistics and Hypotheses Testing

The Wilcoxon Signed Rank Test was used to measure the significance of these differences. The alpha level was set at 0.05 for all the paired tests. The effect size was measured by dividing the Z value by the square root of the sample size (12×2=24).

$$\text{Effect Size (r)} = \frac{Z}{\sqrt{N}}$$

The decision about the effect size was made using Cohen's criteria of 0.1=small effect, 0.3=medium effect, and 0.5=large effect.

Change in Weight Before and After Use of Semaglutide Only

Wilcoxon signed-rank test was used to analyze the difference between the weight of non-diabetic adults before and after using semaglutide alone.

	N	Mean Rank	Sum of Ranks	Z	Sig.
Negative Ranks	12	6.50	78.00	-3.062	.002
Positive Ranks	0	.00	.00		
Ties	0				
Total	12				

α=.05; √N=4.90

The test showed a statistically significant reduction in weight following the intervention of semaglutide alone, Z = -3.062, p = 0.002, with a large effect size (r=.62). The median score of weight decreased from the start of semaglutide alone (Md=188.00) to the end of semaglutide alone (Md=169.50). The null hypothesis that "*there is no statistically significant difference in weight of non-diabetic adults before and after using semaglutide alone*" is rejected, and the alternative hypothesis that "*there is a statistically significant difference in weight of non-diabetic adults before and after using semaglutide alone*" is accepted. These results show that after

administering semaglutide alone, a decrease of 18.50 lbs in weight was recorded. With 12 negative and no positive ranks, the data show that a decrease was recorded for all 12 cases. Previous studies also concluded that semaglutide is effective in long-term weight loss, irrespective of the study period or research design (Deng et al., 2022).

Change in BMI Before and After the Use of Semaglutide Only

Wilcoxon signed-rank test was used to analyze the difference between the BMI of non-diabetic adults before and after using semaglutide alone.

	N	Mean Rank	Sum of Ranks	Z	Sig.
Negative Ranks	12	6.50	78.00	-3.086	.002
Positive Ranks	0	.00	.00		
Ties	0				
Total	12				

α=.05; √N=4.90

The Wilcoxon signed rank test revealed a statistically significant decrease in BMI after administering semaglutide alone, Z=-3.086, p=0.002, with a large effect size (r=.63). The median score of BMI decreased from the start of semaglutide only (Md=31.50) to BMI at the end of semaglutide only (Md=29.00). The null hypothesis that "*there is no statistically significant difference in BMI of non-diabetic adults before and after using semaglutide alone*" is **rejected**, and the alternative hypothesis that "*there is a statistically significant difference in BMI of non-diabetic adults before and after using semaglutide alone*" is **accepted**. These results show that after administering semaglutide alone, a 2.5-point decrease was recorded in BMI. With 12 opposing and no positive ranks, the data show a decrease for all 12 cases.

Change in Weight Before and After the Use of Semaglutide in Combination with IF

Wilcoxon signed-rank test was used to analyze the difference between the weight of non-diabetic adults before and after using semaglutide and IF.

	N	Mean Rank	Sum of Ranks	Z	Sig.
Negative Ranks	12	6.50	78.00	-3.084	.002
Positive Ranks	0	.00	.00		
Ties	0				
Total	12				

α=.05; √N=4.90

The test also showed a statistically significant decrease in weight following the intervention of semaglutide in combination with IF, Z = -3.084, p = 0.002. The effect size was large (r=.63). The median score of weight decreased from the start of combining semaglutide with IF (Md=169.50) to the end of the intervention (Md=157.50). The null hypothesis that "*there is no statistically significant difference in weight of non-diabetic adults before and after using semaglutide in combination with Intermittent Fasting*" is rejected, and the alternative hypothesis that "*there is a statistically significant difference in weight of non-diabetic adults before and after using semaglutide in combination with Intermittent Fasting*" is accepted. These results show that after administering semaglutide in combination with IF, a 12 lb decrease in weight was recorded. With 12 opposing and no positive ranks, the data show a decrease for all 12 cases. These findings align with previous studies' findings, which also concluded that combining semaglutide with changes in lifestyle, including fasting, is associated with a long-term clinically relevant decrease in body weight (Wilding et al., 2022).

Change in BMI Before and After the Use of Semaglutide in Combination with IF

Wilcoxon signed-rank test was used to analyze the difference between the BMI of non-diabetic adults before and after using semaglutide and intermittent fasting (IF).

	N	Mean Rank	Sum of Ranks	Z	Sig.
Negative Ranks	12	6.50	78.00	-3.166	.002
Positive Ranks	0	.00	.00		
Ties	0				
Total	12				

α=.05; √N=4.90

The results of the test also revealed a statistically significant reduction in BMI after administering semaglutide in combination with IF, Z=-3.166, p=0.002, with a large effect size (r=.65). The median score of BMI decreased from the start of the intervention (Md=29.00) to BMI at the end of intervention (Md=27.00). The null hypothesis that "*there is no statistically significant difference in BMI of non-diabetic adults before and after using semaglutide in combination with Intermittent Fasting*" is rejected, and the alternative hypothesis that "*there is a statistically significant difference in BMI of non-diabetic adults before and after using semaglutide in combination with Intermittent Fasting*" is accepted. These results show that two 2-point decrease was recorded in the BMI of non-diabetic adults during the two months. With 12 opposing and no positive ranks, the data show a decrease for all 12 cases.

Conclusion

This study concludes that semaglutide, individually and in combination with IF, is effective for short-term weight loss in non-diabetic adults. Further research with larger, more diverse populations and extended duration is recommended. This study can serve as a foundation for future research evaluating the impact of adding IF into existing pharmacological weight loss

medications to create more sustainable weight management programs and combat the obesity epidemic.

The study results show that semaglutide alone and in combination with IF cause weight loss and reduce BMI in non-diabetic adults. The slightly higher difference in median values for semaglutide alone compared to median values of the combination of semaglutide and IF showed that semaglutide alone causes more reduction both in weight and BMI compared to the administration of Semaglutide along with IF. This difference could be due to the difference in the period between recording pre- and post-weight and BMI of the 12 patients. The semaglutide alone was administered longer than the combination of IF. This minor difference in the period of the two interventions may be the reason for recording less reduction in weight and BMI when semaglutide was administered in combination with IF compared to administering only semaglutide. Also, the difference is low compared to the higher differences between the periods of the two interventions. Therefore, it can be safely concluded that semaglutide contributes highly to weight loss and BMI reduction in non-diabetic adults separately and in combination with IF.

Answering the PICOT question, this study concludes that "*In non-diabetic adult patients aged 18-64 with a BMI of 25 to 39 who have not responded to conventional diet and exercise regimens (P), the off-label use of semaglutide for weight management in combination with Intermittent Fasting or IF (I) compared to the off-label use of semaglutide alone (C) impact weight loss equally in terms of percentage weight loss and BMI improvement (O) over a 2-month period (T)?*".

Recommendations

There are four (4) recommendations for future researchers. First, this study was comprised of only twelve (12) patients with obesity. Future studies can include a larger sample. Second, this study focused on adult patients with obesity. Scholars can focus on people of other age groups, particularly children. Third, the study did not include differential effects of semaglutide for males and females. Future studies can compare the effects of semaglutide on males and females. Furthermore, and four, future researchers can study the effects of semaglutide for a more extended period, i.e., more than two months.

Current Relevance

The above conclusions and recommendations are relevant because of ongoing concern that discontinuing semaglutide can cause regaining weight loss and, therefore, negating the whole weight management program (Wilding et al., 2022). The hope is that semaglutide can reduce hungering enough to a point when the patient naturally adopts IF even after the semaglutide is titrated off, therefore resulting in maintaining the current weight loss and, thereby, a sustainable weight management program. This author hopes this study will serve as a springboard for future studies and research evaluating the impact of adding IF into an existing pharmacological weight loss medication such as semaglutide to create a more sustainable weight management program. And then perhaps the adoption of this combined intervention to effectively combat the currently raging obesity epidemic.

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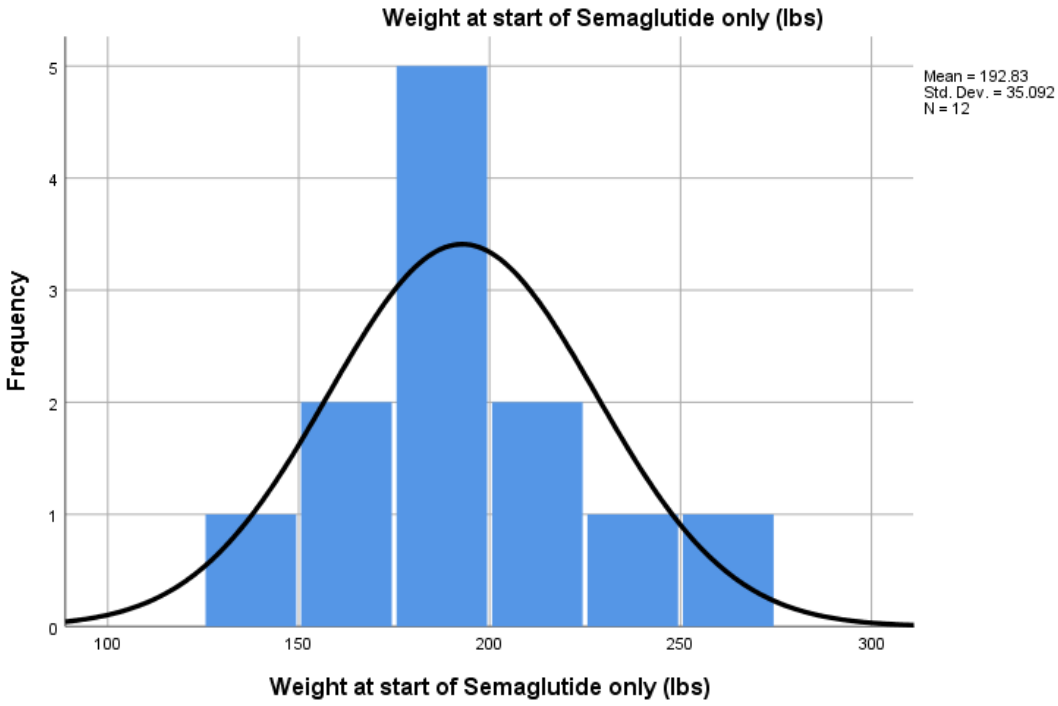
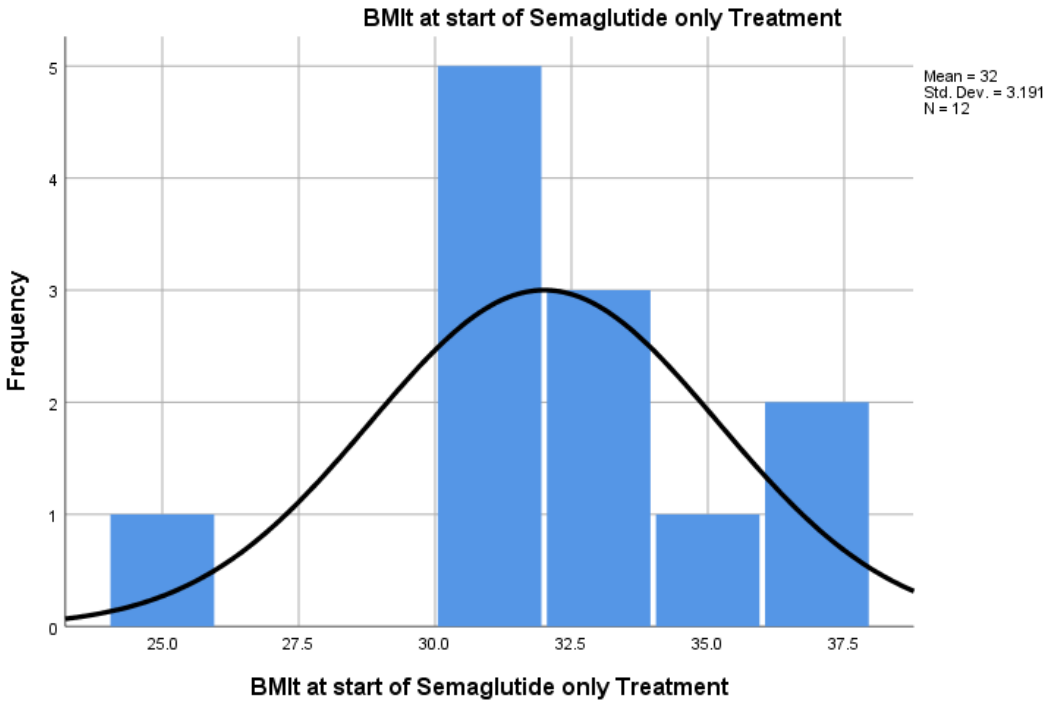
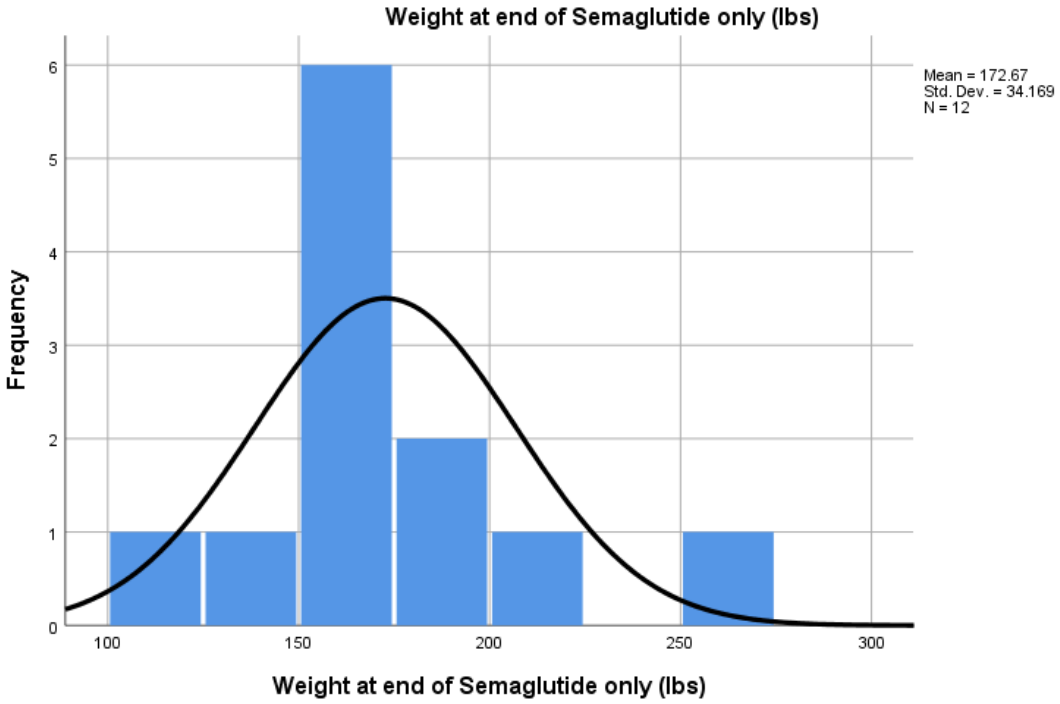
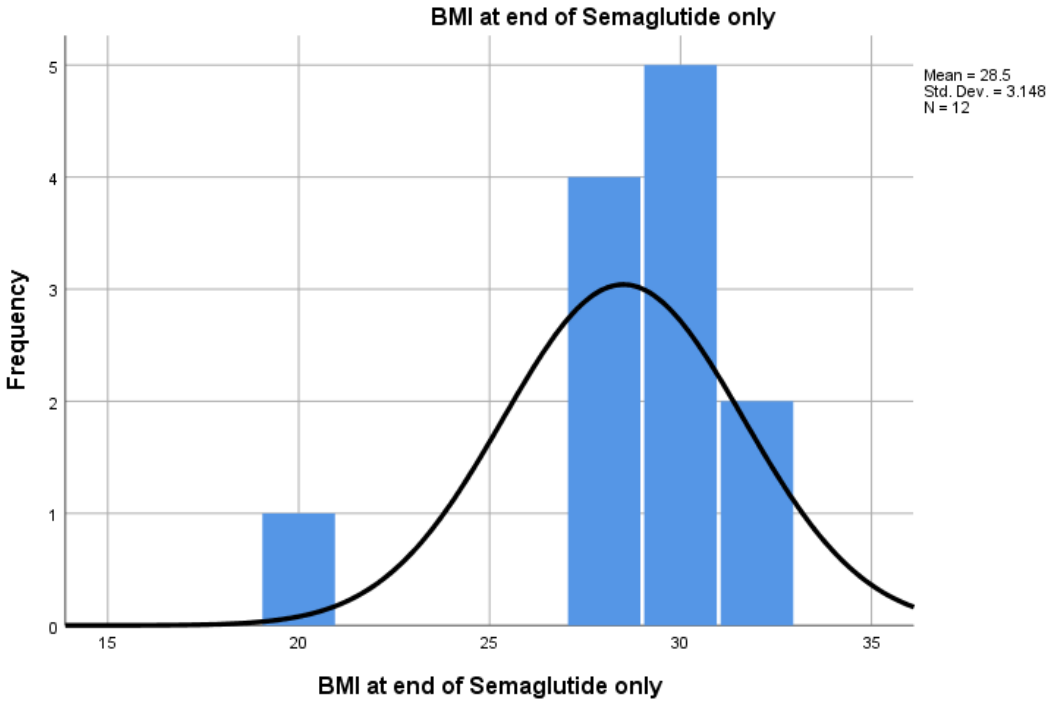
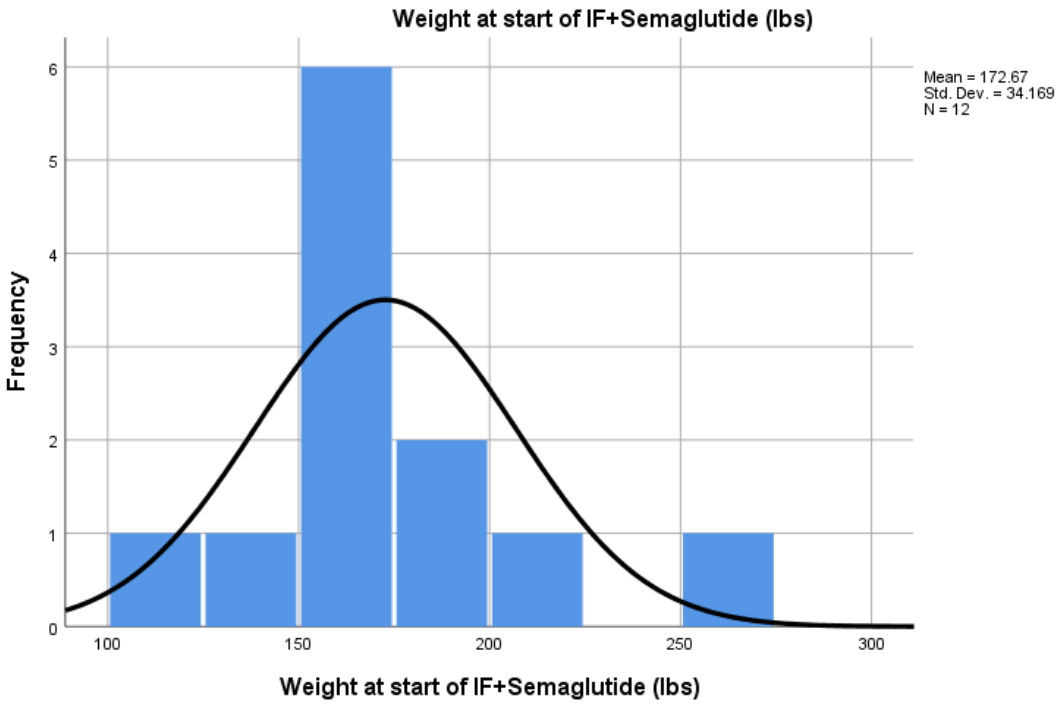
Appendix A

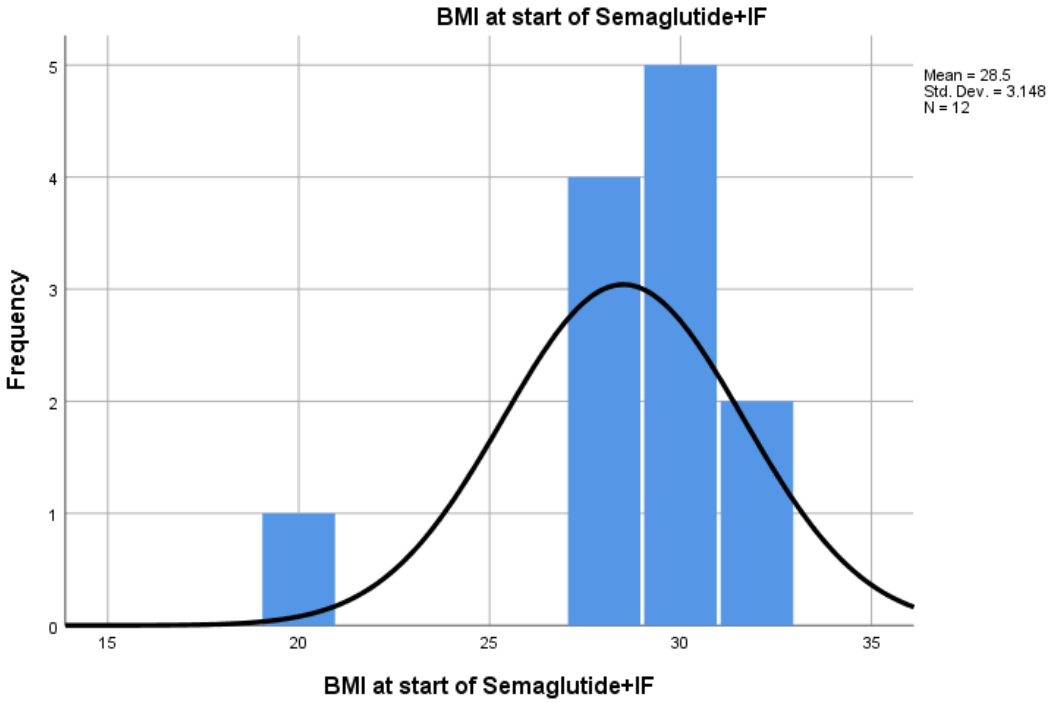

Weight at start of Semaglutide only (lbs)
Mean = 192.83
Std. Dev. = 35.092
N = 12
Frequency
0
1
2
3
4
5
100
150
200
250
300
Weight at start of Semaglutide only (lbs)

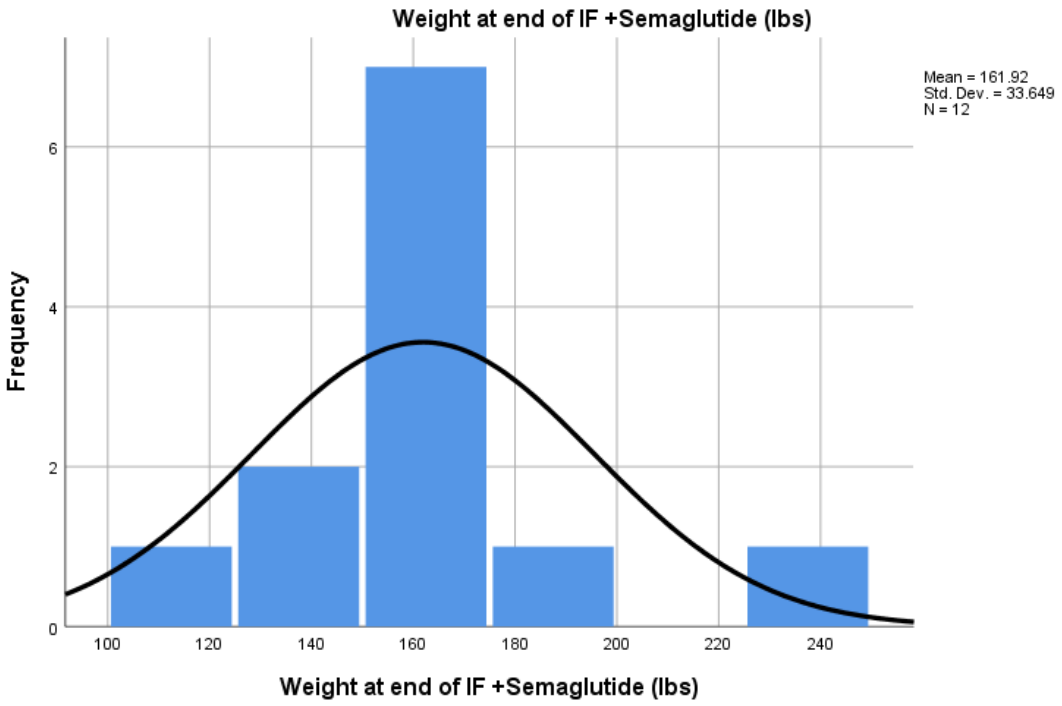

BMIt at start of Semaglutide only Treatment
Mean = 32
Std. Dev. = 3.191
N = 12
Frequency
0
1
2
3
4
5
25.0
27.5
30.0
32.5
35.0
37.5
BMIt at start of Semaglutide only Treatment

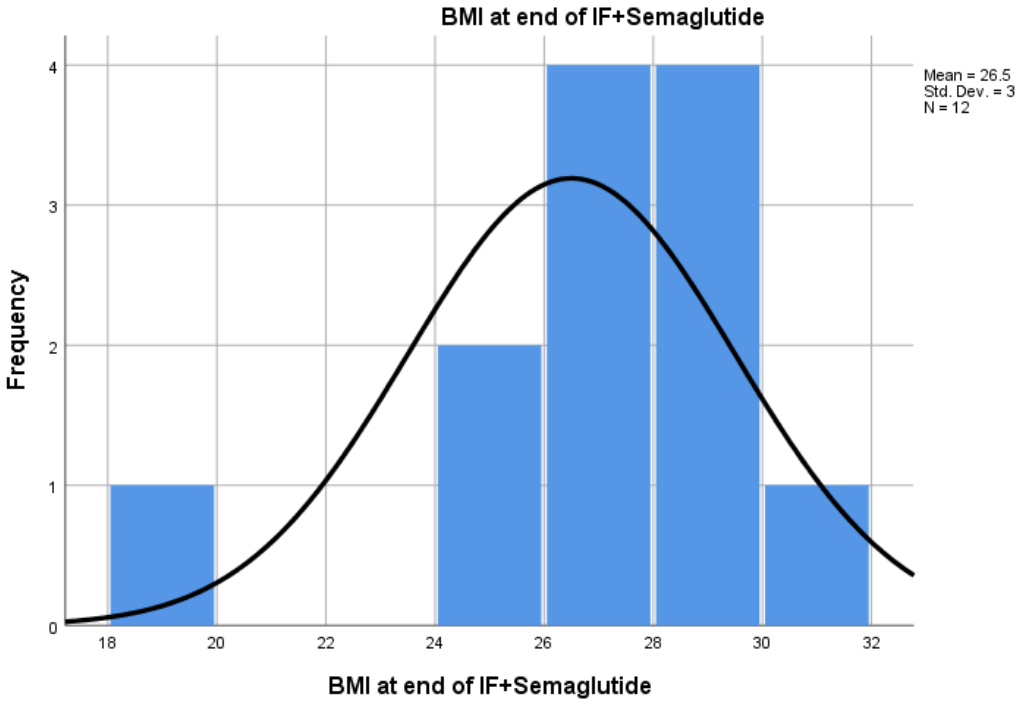

Weight at end of Semaglutide only (lbs)
Mean = 172.67
Std. Dev. = 34.169
N = 12
Frequency
0
1
2
3
4
5
6
100
150
200
250
300
Weight at end of Semaglutide only (lbs)


BMI at end of Semaglutide only
Mean = 28.5
Std. Dev. = 3.148
N = 12
Frequency
0
1
2
3
4
5
15
20
25
30
35
BMI at end of Semaglutide only

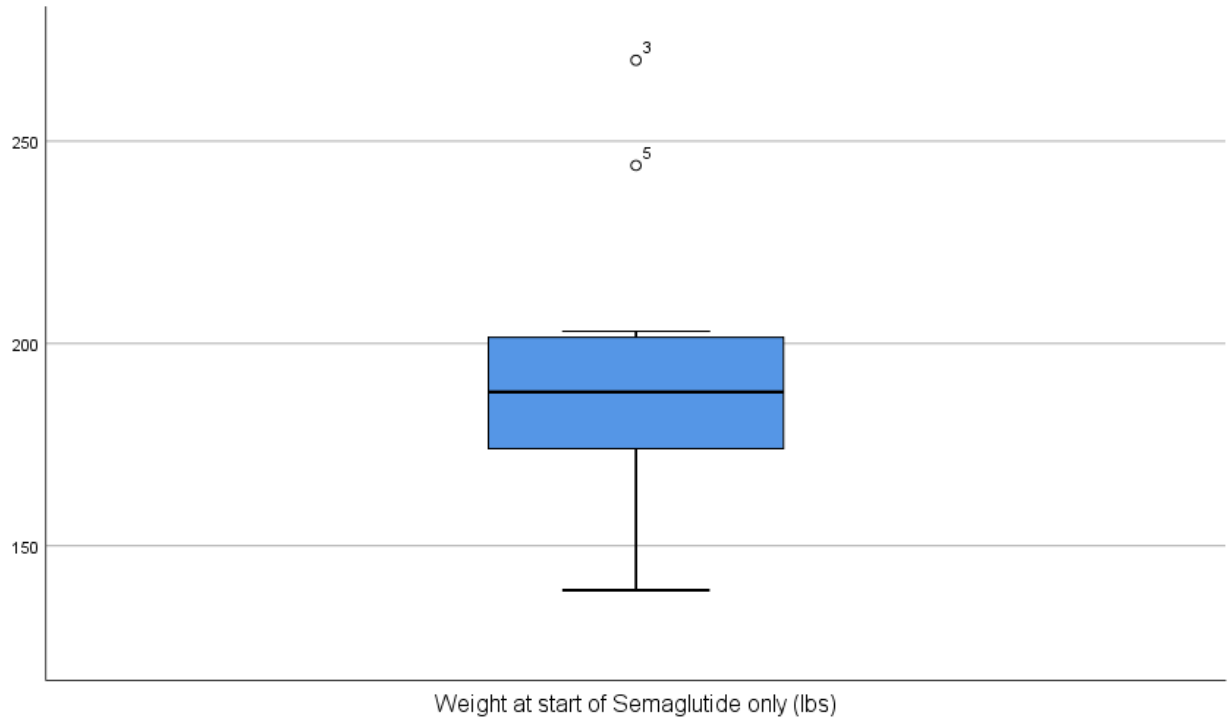

Weight at start of IF+Semaglutide (lbs)
Mean = 172.67
Std. Dev. = 34.169
N = 12
Frequency
0
1
2
3
4
5
6
100
150
200
250
300
Weight at start of IF+Semaglutide (lbs)

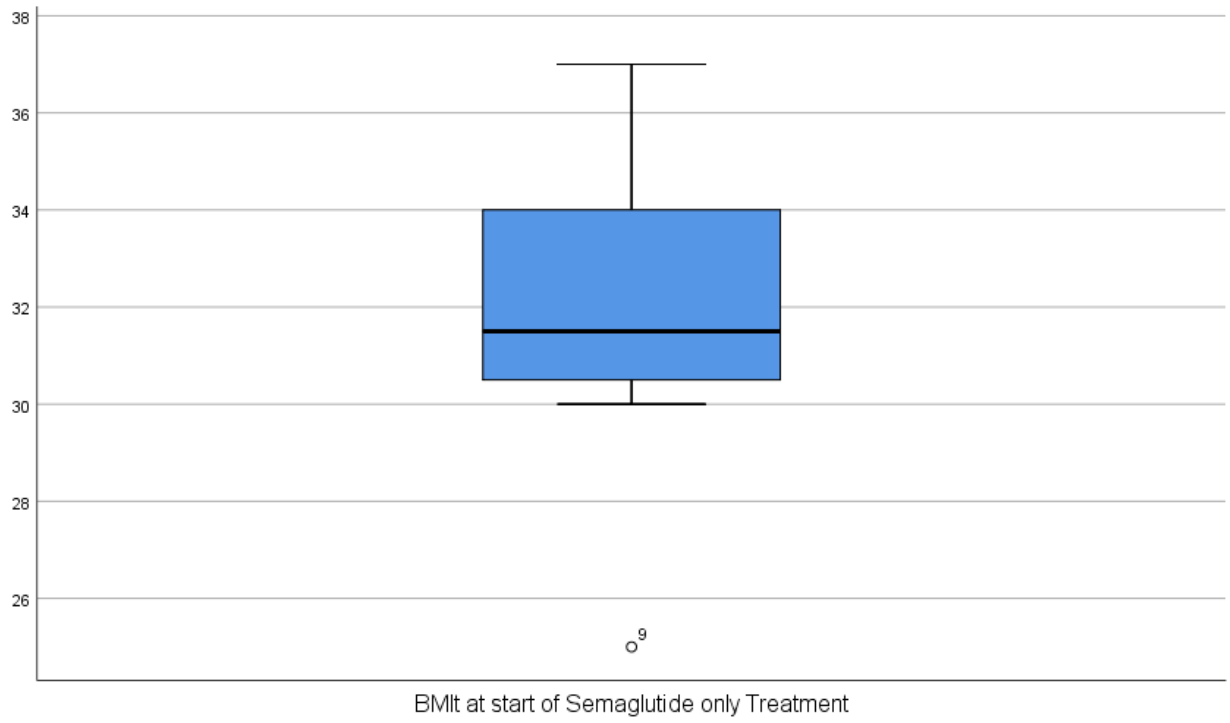

BMI at start of Semaglutide+IF
Mean = 28.5
Std. Dev. = 3.148
N = 12
Frequency
0
1
2
3
4
5
15
20
25
30
35
BMI at start of Semaglutide+IF

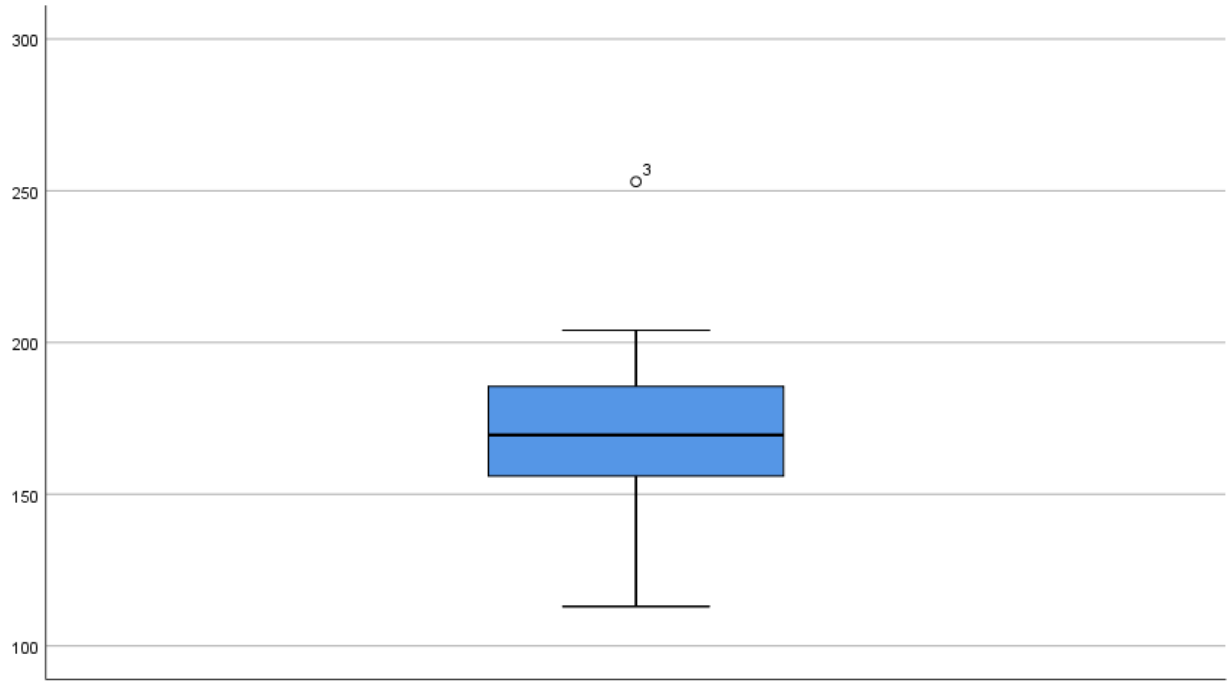

Weight at end of IF +Semaglutide (lbs)
Mean = 161.92
Std. Dev. = 33.649
N = 12
Frequency
0
2
4
6
100
120
140
160
180
200
220
240
Weight at end of IF +Semaglutide (lbs)

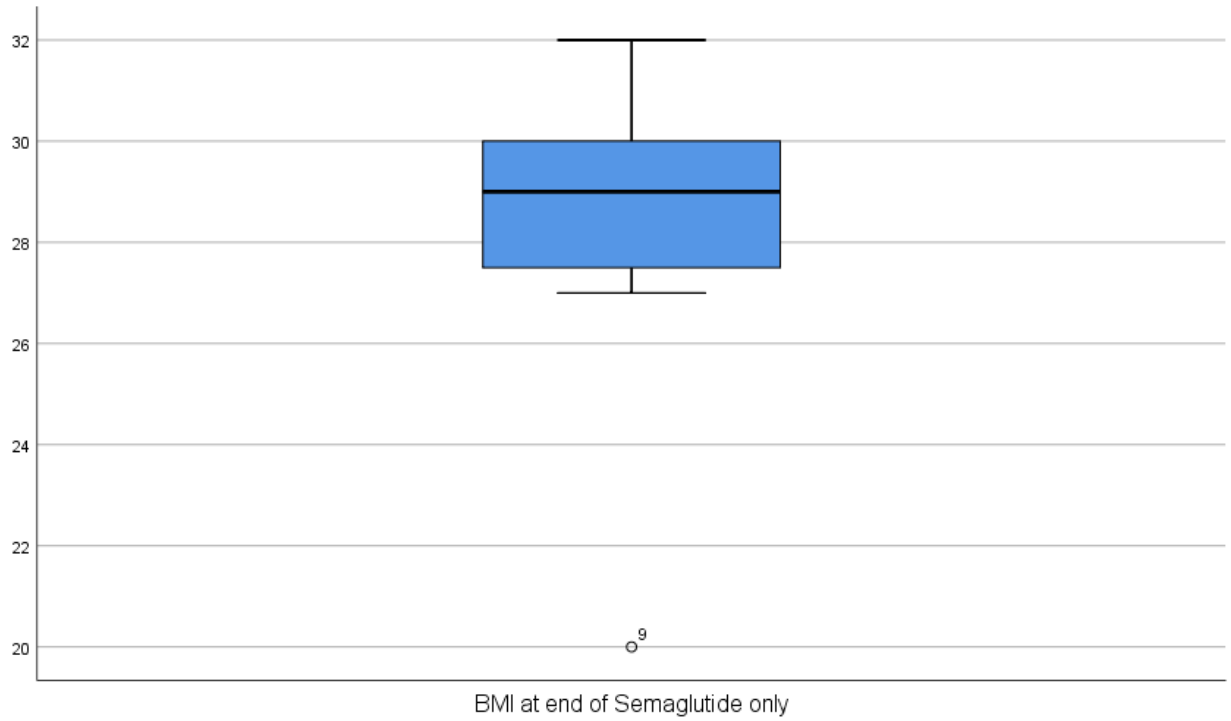

BMI at end of IF+Semaglutide
Mean = 26.5
Std. Dev. = 3
N = 12
Frequency
0
1
2
3
4
18
20
22
24
26
28
30
32
BMI at end of IF+Semaglutide

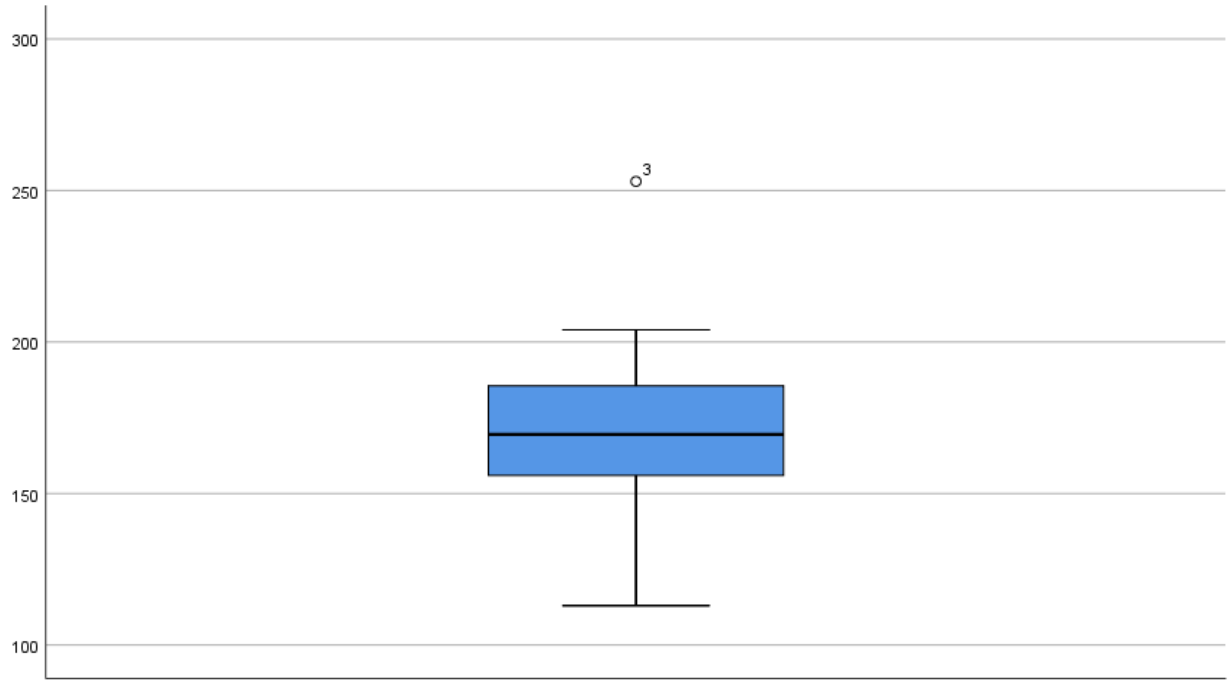
Appendix B

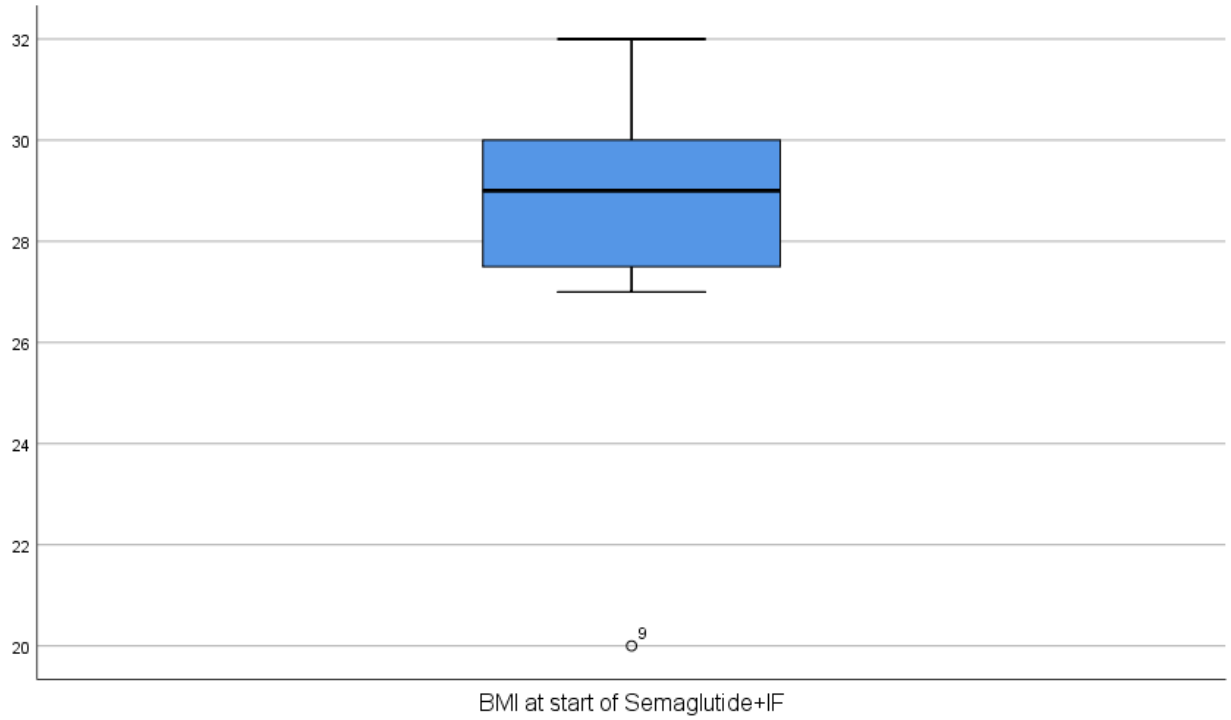

250
200
150
3
5
Weight at start of Semaglutide only (lbs)

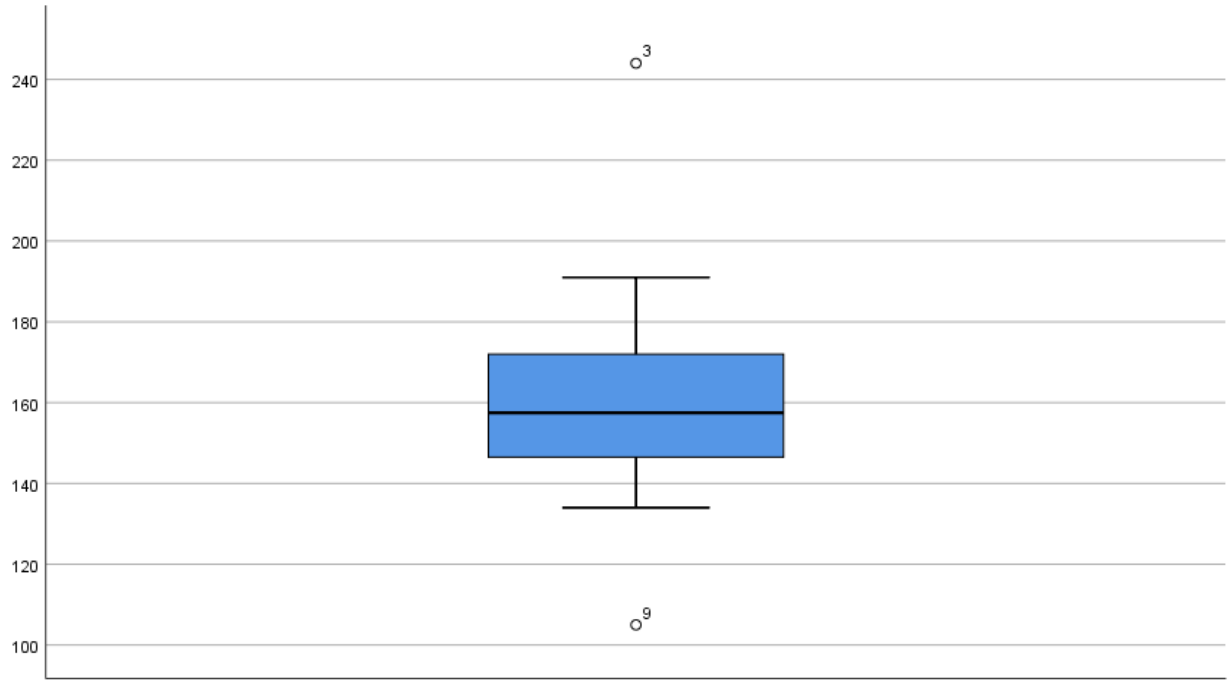

38
36
34
32
30
28
26
9
BMIt at start of Semaglutide only Treatment


300
250
200
150
100
3
Weight at end of Semaglutide only (lbs)

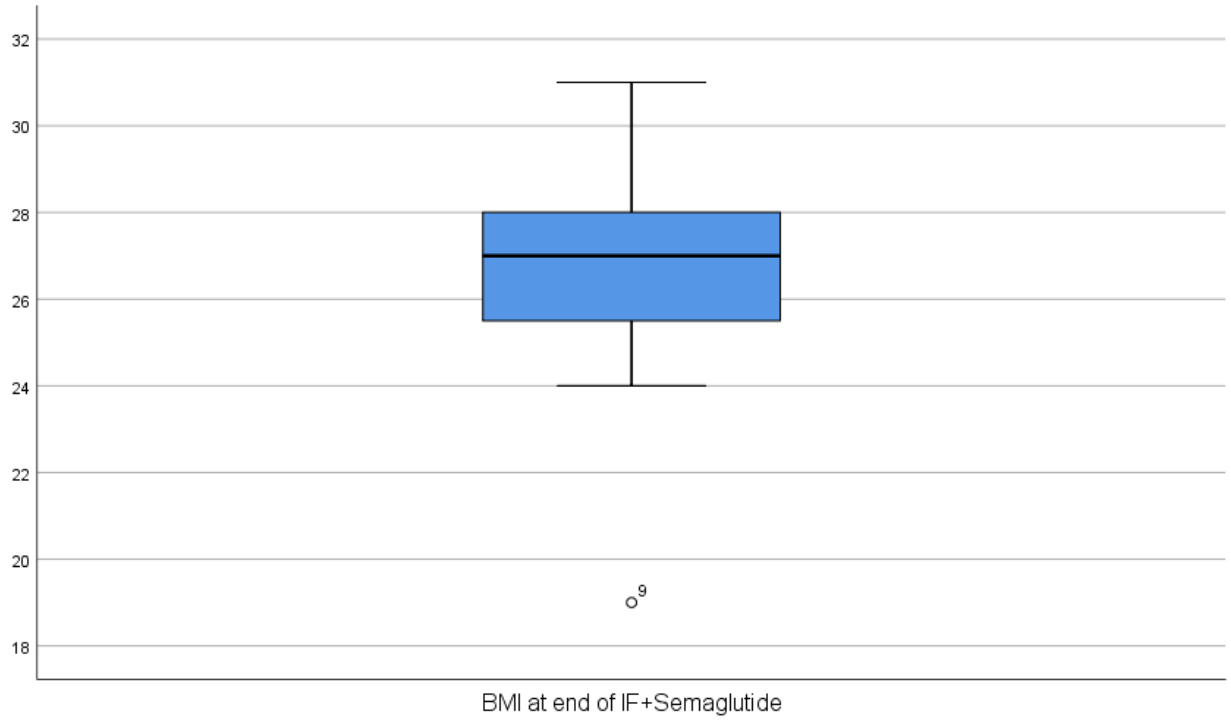

32
30
28
26
24
22
20
9
BMI at end of Semaglutide only


300
250
200
150
100
3
Weight at start of IF+Semaglutide (lbs)


32
30
28
26
24
22
20
9
BMI at start of Semaglutide+IF



Weight at end of IF +Semaglutide (lbs)



BMI at end of IF+Semaglutide