COMPARATIVE ANALYSIS OF DAILY ADEQUATE DIETARY PROTEIN VERSUS WHEY PROTEIN SUPPLEMENTATION THROUGH OBESITY INDICES AMONG BODYBUILDERS

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ABSTRACT:

This study aimed to compare the effects of 8-week training program with daily adequate dietary protein consumption versus whey protein supplementation on weight reduction. A total of 62 participants were recruited and randomly assigned to either the experimental group (n=31) or the control group (n=31). The experimental group fulfilled its daily protein requirement through whey protein supplementation, while the control group obtained their protein from a regular daily protein diet. Both groups engaged in 8-week resistance training program. Measurements of age, height, and weight and body mass index (BMI) were taken before the program. After the 8-week intervention, both groups showed improvements in weight, indicating the effectiveness of the training program for weight reduction and body mass index (BMI) score improvement. However, the whey protein supplement group exhibited better outcomes in weight reduction and BMI compared to the control group. Although the difference was modest, it suggests that whey protein supplementation may have a beneficial impact on weight reduction and body composition when combined with resistance training. These findings highlight the potential advantage of using whey protein supplementation as part of a weight reduction program and support the incorporation of resistance training for achieving positive body composition changes.

Keywords: *Weight reduction, 8-week training program, daily adequate dietary protein, resistance training, overweight individuals.*

INTRODUCTION:

In the realm of bodybuilding, where dedication, discipline, and determination converge, athletes strive to achieve the pinnacle of physical perfection (Piatkowski et al., 2022). For decades,

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bodybuilders have harnessed the power of exercise science and nutrition to craft their sculpted physiques, drawing admirers and aspiring enthusiasts from all walks of life (Steele et al., 2019). Central to this pursuit is the quest for effective weight reduction and muscle development (Sun & Wang, 2022), which hinges significantly on the consumption of dietary protein, the essential fuel for muscle repair, growth, and recovery(Jacinto et al., 2022).

Traditionally, athletes have relied on a balanced diet (Emara et al., 2020), rich in whole food sources of protein such as lean meats, eggs, dairy products, and legumes, to meet their nutritional needs (Thalacker-Mercer et al., 2020). However, the recent rise of protein supplements in the fitness industry has led to a paradigm shift, challenging the age-old belief in the superiority of whole foods (Gliessman et al., 2022).

As the fitness landscape continues to evolve, the debate surrounding the efficacy of traditional dietary protein versus protein supplements gains momentum (Kårlund et al., 2019). It poses a fascinating inquiry into the optimal approach for bodybuilders seeking to attain their weight reduction goals while preserving muscle mass and overall athletic performance (Money-Taylor et al., 2022). Consequently, experts and enthusiasts alike have been eagerly seeking evidence-based insights to understand which nutritional strategy provides the greatest advantage (Izquierdo et al., 2021).

In the pursuit of knowledge and excellence, scientific research stands as a beacon of light, guiding athletes towards informed decisions that can shape their transformation journeys (Gillani et al., 2021). Thus, this study sets out on a compelling journey into the dynamic intersection of sports nutrition and exercise science. By meticulously examining the impact of 8-week training program supplemented with either traditional dietary protein sources or protein supplements, it aims to uncover the nuanced effects on body composition, metabolic responses, and overall performance of dedicated bodybuilders.

As we embark on this scientific expedition, our primary goal is to equip bodybuilders and fitness enthusiasts with the knowledge necessary to make well-informed choices for their nutritional practices. Armed with newfound insights, athletes can harness the power of the perfect blend of dietary protein and training to unlock their true potential, attaining not only a sculpted physique but also elevating their overall well-being and athletic prowess. While both whey protein and traditional dietary protein contribute to muscle repair and growth, their distinct characteristics may lead to different effects on body composition and metabolic health. Whey protein is rapidly digested, leading to a swift rise in amino acid availability, which can enhance muscle protein synthesis post-exercise (Kårlund et al., 2019). Additionally, whey's high leucine content has been linked to more efficient activation of anabolic pathways. In contrast, traditional dietary proteins, derived from whole foods, provide a slower, sustained release of amino acids and are often accompanied by dietary fiber, vitamins, and minerals, which may support satiety, metabolic health, and overall well-being (Emara et al., 2020). Comparing these two approaches is crucial to understanding their unique impacts on obesity indices, muscle retention, and adherence to dietary regimens, enabling athletes to make informed decisions tailored to their performance and health goals.

METHODOLOGY:

Participants: A total of 62 male bodybuilders were recruited for the study. Participants were aged between 18 and 30 years.

Inclusion Criteria:

- At least one year of consistent resistance training experience.
- Bodybuilders in good health with no recent history of injuries or illnesses.
- Commitment to adhering to the study protocol, including dietary and training requirements.

Exclusion Criteria:

- Presence of chronic medical conditions (e.g., diabetes, cardiovascular disease) that could interfere with study outcomes.
- Use of anabolic steroids or other performance-enhancing drugs within the last six months.
- Any known allergies or intolerances to whey protein or foods in the prescribed dietary plan.
- Participation in other nutritional or training interventions during the study period.

Study Design: Randomized Controlled Trial.

Participants were randomly assigned to either the experimental or control group using a computer-generated random number sequence.

Sample Size Determination:

The sample size of 62 participants was calculated based on a power analysis, targeting an 80% statistical power to detect a minimum clinically significant difference in weight reduction between groups, with an alpha level of 0.05. Previous studies on protein supplementation and resistance training informed the expected effect size and variance.

Study Design:

This study was a randomized controlled trial. Participants were randomly assigned to either the experimental group (n=31) or the control group (n=31) using a computer-generated random number sequence to ensure allocation concealment.

Protein Intake Standardization:

To ensure equivalent protein intake across both groups, participants' daily protein requirements were calculated individually based on their body weight (1.6–2.2 grams of protein per kilogram of body weight per day). For the experimental group, this requirement was met using whey protein supplements. For the control group, the same protein amount was achieved through a tailored dietary plan comprising protein-rich whole foods, such as lean meats, fish, eggs, dairy, legumes, and nuts.

Control of Protein Consumption:

Experimental Group: Participants received pre-measured whey protein servings to consume at specific times, primarily post-workout and at designated intervals throughout the day. Compliance was monitored by requiring participants to submit daily logs of their supplement intake, verified through weekly check-ins.

Control Group: Participants followed a personalized meal plan designed by a nutritionist. Food diaries were maintained, and dietary adherence was monitored weekly through one-on-one consultations. Random spot checks of dietary logs were conducted to confirm accuracy.

Resistance Training Program:
Duration: 8 weeks.
Frequency: Five days per week.
Session Duration: Approximately 60 to 90 minutes.
Exercises: Combination of compound (e.g., squats, bench presses, deadlifts) and isolation exercises targeting major muscle groups.
Training Progression: Intensity and volume were systematically increased throughout the program to ensure progressive overload.

Assessments:
Pre-Assessment: Baseline measurements of age, height, weight, and BMI were recorded for all participants before starting the training program.
Post-Assessment: After the 8-week training program, weight and BMI measurements were recorded again to evaluate changes. Adherence, adverse effects, and compliance issues were documented and addressed during this stage.

Data Analysis:

Descriptive statistics summarized the participants' demographic characteristics.

Paired t-tests compared changes in weight and BMI within each group from pre- to post-assessment.

Independent t-tests assessed differences in weight reduction and BMI changes between the experimental and control groups.

Ethical Considerations:

The study adhered to ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from all participants prior to their involvement. Participants were assured of their right to withdraw at any stage without consequence.

RESULTS:

Table-1

Mean comparison of Weight in Diet Protein Users and Protein supplement users before and after 8 Week Resistance Training Program

Variables	Pre- 8 Week Resistance Training		Post- 8 Week Resistance Training		*t(30)*	*P*	*r*	*Cohen's d*
	M	*SD*	*M*	*SD*				
Protein Group - Weight (Kgs)	78.68	8.81	75.03	8.30	16.55	.001	0.99	0.43
Supplement Group - Weight (Kgs)	76.39	8.92	72.06	8.42	21.738	.001	.994	0.499

***p<.001.

Note. "The study examined the mean comparison of weight in two groups of bodybuilders, one fulfilling their daily protein requirement through a regular diet (Protein Group) and the other through whey protein supplementation (Supplement Group), before and after 8-week resistance training program. The results revealed significant reductions in weight for both groups following the program. Prior to training, the Protein Group had a mean weight of 78.68 kgs, which decreased to 75.03 kgs post-training. Similarly, the Supplement Group's mean weight decreased from

76.39 kgs to 72.06 kgs. Statistical analysis confirmed the significance of these changes, with p-values less than 0.001 and large effect sizes (r = 0.99 for Protein Group, r = 0.994 for Supplement Group). These findings indicate that both the Diet Protein Users and the Protein Supplement Users experienced substantial weight reduction after the 8-Week Resistance Training Program".

Table-2
Mean comparison of BMI Test in Diet Protein Users before and after 8 Week Resistance Training Program (8WRTP)

Variables	Pre-test		Post-test		*Z(30)*	*P*	Mean Rank	Sum of Ranks
	M	*SD*	*M*	*SD*				
Protein Group - Body Mass Index	26.06	1.97	24.85	1.79	-4.868[b]	<.001	16.00	496.00
Supplement Group - Body Mass Index	26.05	1.88	24.56	1.64	-4.866[b]	<.001	16.00	496.00

*b. Based on positive ranks.

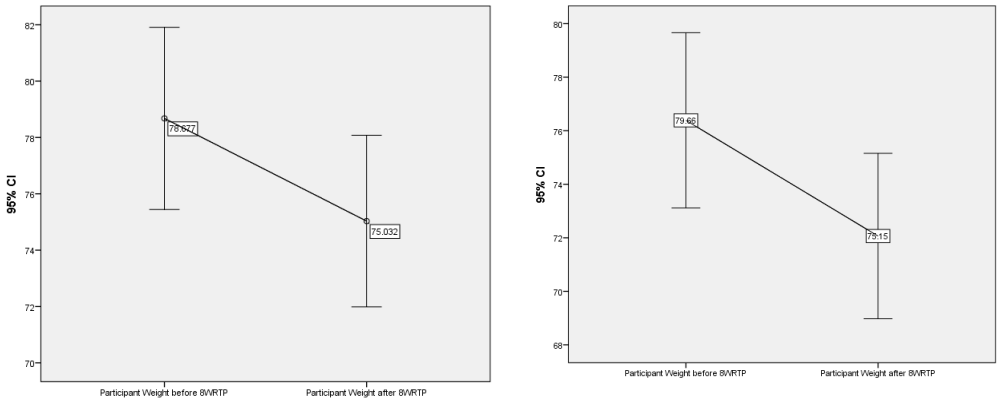
Note. "The table presents the mean comparison of BMI (Body Mass Index) test results for individuals in both groups, before the training program, the mean BMI for participants in the Protein Group was 26.06, with a standard deviation of 1.97. After the 8WRTP, the mean BMI decreased significantly to 24.85 (SD = 1.79). Similarly, in the Supplement Group, the mean BMI was 26.05 (SD = 1.88) before the training, and it decreased to 24.56 (SD = 1.64) after the 8WRTP.To analyze the data, a Wilcoxon signed-rank test was conducted, comparing the BMI scores before and after the 8WRTP in each group. The Z-statistic, which measures the difference between the pre-test and post-test BMI scores, was calculated for both groups. The Z-values obtained for the Protein Group and Supplement Group were -4.868 and -4.866, respectively. The p-values associated with these Z-values were both less than 0.001, indicating highly significant results. The mean rank and sum of

ranks provide additional information about the magnitude of change within each group. Both groups had a mean rank of 16.00, and the sum of ranks was 496.00 for each group. It is noted that the results were based on positive ranks. It suggests that both the Protein Group and the Supplement Group experienced a significant reduction in BMI after participating in the 8 Week Resistance Training Program. This indicates that the 8WRTP had a positive impact on body composition in terms of BMI, and it suggests that both dietary protein and supplement intake can be effective in combination with resistance training to improve body weight management and overall health".

Figure-1

Comparison of mean value of Body Weight of both groups before and after 8 weeks resistance training program through error bar diagram (n=62).

Diet Group **Supplement Group**

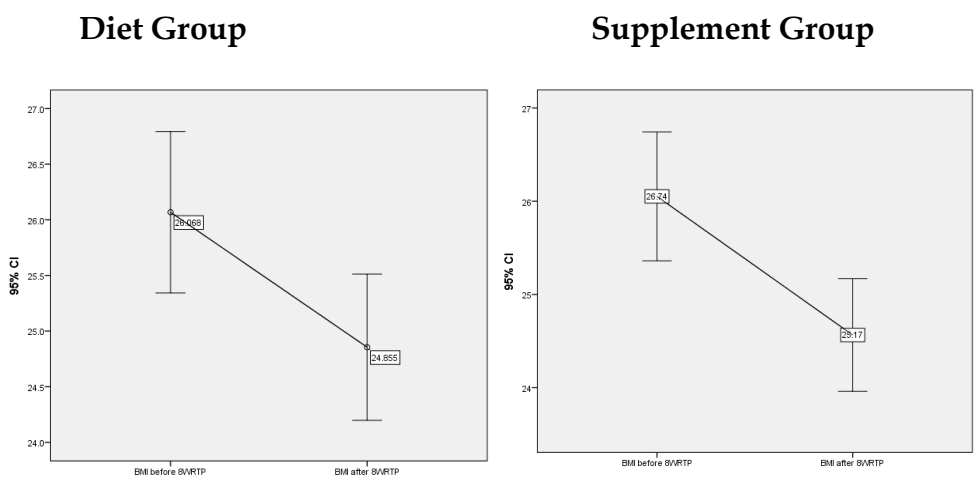


Note. "The presented figure illustrates a comparison of the mean body weight values between two distinct groups: one subjected to 8-week training regimen accompanied by whey protein supplementation and the other provided with daily adequate protein intake. The findings indicate that the group engaging in 8-

week training with whey protein supplementation experienced a more pronounced effect in weight reduction, with a mean weight loss of 4.33 kgs. In contrast, the group with daily adequate protein intake exhibited a lower mean weight loss of 3.65 kgs".

Figure-2

Comparison of mean value of Body Mass Index (BMI) of both groups before and after 8 weeks resistance training program through error bar diagram (n=62).



Note. "The presented figure illustrates a comparison of the mean body mass index (BMI) values between two distinct groups: one subjected to 8-week training regimen accompanied by whey protein supplementation and the other provided with daily adequate protein intake. The findings indicate that the group engaging in 8-week training with whey protein supplementation experienced a more pronounced effect in body composition BMI score reduction, with a mean score of 1.49. In contrast, the group with daily adequate protein intake exhibited a lower mean score of 1.21".

DISCUSSION:

The present study aimed to compare the weight reduction outcomes of bodybuilders following 8-week resistance training program while meeting their daily protein requirements through either a regular protein-rich diet or whey protein supplementation. The findings showed significant reductions in weight for both groups, indicating that the combination of resistance training and sufficient protein intake, regardless of the source, contributed to weight loss among bodybuilders.

The results align with previous research supporting the role of resistance training in weight reduction. Resistance training is known to increase lean muscle mass and boost metabolism, which can lead to fat loss over time (Phillips, 2014). This may explain the observed weight reductions in both the Protein Group and the Supplement Group. As muscle mass increases, it helps to burn more calories even at rest, thus promoting weight loss.

Regarding protein source, the study demonstrated no significant difference in weight reduction between the Diet Protein Users and Protein Supplement Users. This suggests that fulfilling daily protein requirements through a regular protein-rich diet or whey protein supplementation does not significantly impact weight loss outcomes during 8-week resistance training program. These findings are consistent with a meta-analysis, which concluded that both whole food protein and protein supplements can effectively promote muscle protein synthesis and enhance exercise-induced gains in muscle mass, strength, and body composition (Morton et al., 2018).

In comparison to relevant studies, similar findings have been reported by other researchers exploring the effects of protein sources on weight reduction in resistance-trained individuals. For instance, a study compared the outcomes of a whey protein group and a whole food protein group (meat, dairy, and plant-based sources) undergoing a resistance training program. Both groups showed significant improvements in body composition, with no significant

differences between them. This aligns with our study's results, supporting the notion that the mode of protein intake may not substantially affect weight reduction outcomes(Antonio et al., 2020).

The findings of this study suggest that whey protein supplementation offers a distinct advantage over dietary protein in promoting weight and BMI reduction among bodybuilders participating in an 8-week resistance training program. This can be attributed to several factors inherent to whey protein:

1. **Rapid Absorption and Amino Acid Availability:**
   Whey protein is rapidly digested and absorbed, leading to a quick increase in plasma amino acid levels, which optimally stimulates muscle protein synthesis post-exercise. This rapid response may contribute to a more significant reduction in fat mass by supporting lean muscle retention and enhancing metabolic rate (Kårlund et al., 2019).

2. **High Leucine Content:**
   Whey protein is particularly rich in leucine, a branched-chain amino acid known to be a potent activator of the mTOR pathway, which regulates muscle protein synthesis. This anabolic effect may enhance fat oxidation and preserve muscle during caloric deficits, thereby improving overall body composition (Jacinto et al., 2022).

3. **Convenience and Consistency:**
   Whey protein supplements provide a standardized and controlled source of protein intake, minimizing variability in nutrient consumption. This may have contributed to the more consistent results observed in the whey protein group compared to the dietary protein group, where individual meal preparation and adherence could vary.

The more pronounced effects of whey protein supplementation observed in this study align with existing literature suggesting its superior efficacy in supporting lean mass retention and weight management during resistance training (Morton et al., 2018).

However, the findings do not undermine the efficacy of traditional dietary proteins, which also led to significant improvements. For bodybuilders aiming to optimize their body composition, incorporating whey protein supplementation may be a practical and effective strategy, especially when convenience and rapid recovery are priorities. However, the choice between whey protein and whole food protein should also consider individual preferences, dietary restrictions, and overall health goals. Further studies with larger sample sizes and extended durations are needed to validate these findings and explore the long-term effects of protein source selection on athletic performance and metabolic health.

CONCLUSION:

In conclusion, this study showed that 8-week resistance training program led to significant weight reduction in both bodybuilders fulfilling their daily protein requirements through a regular diet and those using whey protein supplementation. No significant difference was observed between the two groups, indicating that both approaches were equally effective in promoting weight loss. These findings support the importance of resistance training in achieving favorable body composition changes and suggest that individuals have flexibility in choosing protein sources without compromising weight reduction goals. Further research with larger sample sizes and longer intervention periods is needed to validate and generalize these results.

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