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ANOREXIC: IMPACT OF COMPLEMENT PROTEIN ALONG WITH ADDITIONAL FOOD CONSUMPTION AND EXERCISE ON ECTOMORPHISM AND ENERGY VARIABLE AMONGST MALES

Hassan Almoslim, Syed Ibrahim*

Physical Education Department, King Fahd University of Petroleum and Minerals, Dhahran, 31261, Saudi Arabia.

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ABSTRACT

The aim of this study was to discern the impact of complementary protein with additional food consumption (AFC) and exercise on ectomorphism and energy variables on anorexic males. Thirty seven participants, 19-25 years, body mass index (BMI) >18.5 kg/m² were allocated to complement protein with AFI plus strength training (C1; n=10), protein with normal food intake (C2, n=8), and control group-3 (C-3 n = 19). The training lasted eight weeks (2 days × 40 M). C1 and C2 were administered with protein twice a week. The tests were BMI, body fat percentage, fat-free mass (FFM), and one-repetition max test in the leg press, chest press, and food intake (FI). ANOVA was applied for age, height, BMI, and repeated measures for BM, %BF, FFM, LP, CP, and FI. The significance level was 0.05. One-way ANOVA revealed no changes for age, H, and BMI (P >0.05). ANOVA with repeated measures resulted in significant effects on time (P <0.05), groups (P <0,05), and interaction effect of time by groups (P <0.05) for BM, LP, CP, and FI. FFM showed significant effects on time (P <0.05) and groups (P <0.05) but no interaction effect on time by groups (P >0.05). The %BF showed no significant effects on time and groups (P >0.05) but there was a significant interaction effect on time by groups (P <0.05). The study indicated that underweight subjects could improve body mass and strength with the training protocol.

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Introduction

Nutritional protein performs a vital part in numerous physiological processes in the human body [1, 2]. The existing recommended dietary allowance (RDA) for fit persons is 0.8 g/kg/day [3]. It is increasingly apparent that protein consumption ranging from 1.4 to 1.6 g/kg/day is highly suitable for active persons endeavoring to augment training [4]. In attempts to achieve this criterion, athletes frequently utilize protein supplements [5]. In 2015, the trade of protein powder was worth 4.7 billion US dollars and was second to sport beverages in the athletic nourishment marketplace [6]. The increased use of protein supplements is possibly connected to the larger, more muscular shape of the body, improved loss of fat, enhanced performance, and superior indicators of recovery at the start or end of weight training [7]. The available protein supplement products in the market are in the form of powders, bars, tabs, gels, and capsules [8].

Weight training (WT) is the principal workout method for enhancing muscle mass. It is observed that the dimensions of exercise executed in a WT program plays a noteworthy part in protracted muscular alterations such as muscle dimension and power [9, 10]. A recent umbrella review confirmed that WT could meaningfully augment muscular power, posture, and performance [11]. Combined statistics from 33 randomized measured experiments revealed that enduring exercises of WT lead to statistically significant progress in bodily function and increase in strength [12, 13].

In some experimental studies, it was found that energy balance could be achieved by augmenting energy consumption beyond energy necessities to conserve body weight. The above investigations intended to undo the physiological changes to nutrient surplus and specifically the advancement of variations in body composition and metabolism [14]. The trends in the hyperactive caloric intake are an average weight gain signifying the existence of tools that stabilize the influence of additional energy intake [15].

The existing knowledge on the investigation for the anorexic subjects has not been adequately examined, and their plight seems to arise from reasons including lean, undernourishment, illness, genes, and thyroid diseases. The subjects under this category have various problems, including no desire for food and abstaining from eating enough food, which causes the

Corresponding Author: Prof. Syed Ibrahim, Physical Education Department, King Fahd University of Petroleum and Minerals, Dhahran, 31261, Saudi Arabia. Email: sibrahim @ kfupm.edu.sa, Mobile: + 966 506137368

underweight condition to remain unchanged. It is believed that if they indulge in some forms of activity apart from increasing their nutrition with the addition of some supplements in the form of protein, it can have a positive impact on solving their problems.

Hence, this study aimed to determine the impact of complementary protein along with additional food consumption and exercise on ectomorphism and energy variables amongst anorexic males.

Method

The Dean of Scientific Research, King Fahd University of Petroleum and Minerals approved this study. Each participant voluntarily provided written informed consent before participating. Healthy male subjects whose body mass index (BMI) was less than 18.5 kg/m^2 were selected for this study. The participants' age ranged from 19 to 25 years, and 28 subjects were drafted for this research. They were allocated to three clusters. The first cluster was the complement protein group along with additional food intake and weight training (C1; n=10), the second cluster was the weight training group with additional food consumption (C2; n=8), and the third cluster was termed the control group (C3; n= 19). The subjects in C3 were asked to engage in their regular activity, excluding the work undertaken by the other clusters. The compliance of the subjects was sought for taking part in the study, and they were appraised to drop from the study if they noticed uneasiness. The training intervention was for eight weeks, two days per week, and 40 minutes per stint. The complement protein was administered with protein twice a week along with the weight training protocol for 40 minutes along with the additional food intake. The components in this investigation were body mass (BM), BMI, % body fat, fat-free mass, one repetition max test in the leg press, chest press, and food intake. Mean and the standard deviation (±SD) were computed to analyze the data for all values using the Statistical Package for the Social Sciences (SPSS) version 16.0 software. Analysis of variance (ANOVA) was applied for age, height, and food intake, and the other variables of the study were computed by repeated measures. The significance level was fixed at 0.05.

Results

Table 1. Physical Characteristics values for three clusters at pre- and post-training

Cluster	Age	Height	Body Mass		Body Mass Index	%Body Fat		Fat-Free Mass	
			Pre	Post		Pre	Post	Pre	Post
1	19±0.31	171±5.1	51.3±4.06	52.9±3.82	17.4±0.8	10.5±3.4	10.5±2.9	45.8±4.0	47.3±3.9
2	19±0.00	170±5.4	50.5±3.8	51.3±3.45	17.3±1.0	10.0±5.1	9.8±5.1	45.3±3.0	46.2±2.8
3	18.9±0.2	168±6.25	48.3±4.85	48.76±5.08	22.2±2.5	9.1±3.9	9.0±4.0	43.0±3.9	44.2±3.9

The data analyses showed no changes in age, height, and body mass index (P >0.05) (Table 1).

Table 2. ANOVA with Repeated Measures –Physical Characteristics

Variable	Source	df	Mean Square	F	Sig
BM	Time	58	45.73	1	0.000
	GROUPS	58	3.933	2	0.52
	TIME * GROUP	58	7.016	2	0.002
% BF	Time	58	0.176	1	0.676
	GROUPS	58	0.759	2	0.473
	TIME * GROUP	58	0.27	2	0.973
FFM	Time	58	40.847	1	0.000
	GROUPS	58	3.849	2	0.27
	TIME * GROUP	58	0.865	2	0.427

For body mass the main effect was on time (F 1, 58df = 45.73, P = 0.00), Group (F 2, 58df = 3.933, P = 0. 52), and there was significant interaction effect on time by group (F2, 58df = 7.016, P = 0.002). The post-test revealed a greater mean value than the pre-test (P< 0.05). C1 showed higher mean value than C3 (P< 0.05). No changes were observed between C1 and C2; as well as between C2 and C3 (P> 0.05). The body fat percentage showed no significant effect on time and group (P >0.005) nor interaction effect for time by group (F2, 58 df = 0.27, P >0.05). For fat-free mass (FFM) there were main effects for time (F1, 58df = 40.847, P =0.00) and group (F2, 58 df = 3.849, P = 0.27), but there was no interaction effect for group by time (F2, 58 df = 0.865, P > 0.05).

Table 3. Strength Variables

Cluster	Pre-Chest Press	Post-Chest Press	Pre-Leg Press	Post-Leg Press
1	55.5±14	67.5±14.7	64.4±19.2	77.1±19.6
2	46.9±9.1	54.3±10.0	55.7±14.6	63.3±14.7
3	44.7±13.9	46.1±9.8	52.3±15.9	53.9±14.1

The post-test showed a greater mean value than the pre-test (P< 0.05). C1 revealed a higher mean value than C3 (P< 0.05). No changes occurred between C1, C2, and C2, C3 (P> 0.05).

Table 4. ANOVA with Repeated Measures –Strength Variables

Variable	Source	df	Mean Square	F	Sig
CP	Time	58	46.455	1	0.001
	GROUPS	58	10.147	2	0.001
	TIME * GROUP	58	10.694	2	0.001
LP	Time	58	49.459	1	0.001
	GROUPS	58	6.690	2	0.003
	TIME * GROUP	58	11.616	2	0.001

Table 4 indicates the values of strength variables where in CP showed main effect for time (F1, 58 df = 46.455, P < 0.001) and group (F2, 58 df = 10.147, P <0.001) and there was an interaction effect for time by group (F2, 58 df = 10.694, P <0.001). C1 indicated greater mean values than C2 and C3 (P< 0.05). C2 also showed a higher mean value than C3 (P <0.05). The post-test had registered a higher mean value than the pre-test did (P <0.05). LP showed significant effects for time (F1, 58df = 49.459, P <0.001) and group (F2, 58 df = 6.690, P < 0.003). There was also an interaction effect for time by group (F2, 58 df = 11.616, P < 0.001).

Table 5. Energy Measurement

Cluster	Food Intake Week 1	Food Intake Week 4	Food Intake Week 8
1	1558±489	1887±653	2014±759
2	1486±410	1755±409	1855±544
3	1468±686	1456±558	1276±399

Table 5 revealed that C1 had greater mean values than C2 and C3 (P< 0.05). C2 also revealed a higher mean value than C3 (P< 0.05). The post-tests recorded greater mean values than the pre-test did (P <0.05).

Table 6. ANOVA with Repeated Measures – FOOD INTAKE

Variable	Source	df	Mean Square	F	Sig
FI	Time	58	4.650	2	0.012
	GROUPS	58	4.752	2	0.012
	TIME * GROUP	58	4.079	4	0.004

In Table 6, the results of the energy variables are described. In FI, there were significant effects for time (F2, 58 df = 4.650, P = 0.012); FI W8 revealed higher mean value than FI W4 (P < 0.05), FI W4 showed greater mean value than FI W 1 (P >0.05). There was a significant effect for group (F2, 58 df = 4.752, P = 0.012). C I revealed greater mean value than C3 (P < 0.05) and there was a significant interaction effect for time by group (F 4, 58 df = 4.079, P = 0.004).

Discussion

The primary goal of the study was to discern the impact of complementary protein with additional food consumption and exercise on ectomorphism and energy variables among anorexic males.

The research indicated that to improve body composition, an increase in muscle size is necessary; this can be attained through strength training [16]. Muscles frequently rise in capacity (and therefore in mass) after continuing strength training. Since they are made up of many discrete fibres, muscles can tentatively rise in capacity because either the number of fibres grow (called hyperplasia), or the volume of each muscle fibre enhances (called fibre hypertrophy). Both of these procedures comprise of an increase in the protein content of the entire muscle, termed “hypertrophy” [17]. Truncated muscle mass is connected with physical inactivity and scant nutrient energy consumption [18]. Resistance training is endorsed in the

managing of metabolic disorders and weight gain [19]. Weight training three times a week is needed for healthy weight gain; it will support acquiring and maintaining lean muscle mass.

Skeletal muscle hypertrophy entails a clear steadiness in which muscle protein synthesis surpasses muscle protein breakdown. Resistance exercise offers the starting tension stimulus that determines hypertrophy resulting from cumulative escalations in muscle protein synthesis following chronic resistance exercise [20]; nonetheless, surges in FFM can be partial if deficient daily protein intake is consumed [21]. In addition to the total amount taken per day, researchers have postulated that the value of protein may boost resistance training-induced muscle improvement [22]. The results of the study point out that there was a significant increase in the body mass and fat-free mass for the experimental group, which agrees with the work in the literature above and is in line with the results of Hartmen et al. (2007), Josse et al. (2010), and Walker et al. (2016) who reported increases of 37%, 10%, and 18%, respectively [23-25]. In contrast, Ballard, et al., (2006) found no noteworthy change [26].

Many studies reported 0.05–1.5% increases for 1-resistance maximum (RM) leg press and 1-RM chest press strength. Protein supplementation considerably improved the gain in mean 1-RM leg press and 1 RM chest press strength in the course of persistent resistance-type exercise training (weighted mean difference: 13.5 kg; 95% CI: 6.4, 20.7 kg; P <0.001) when compared with the other intervention groups in younger males. To gain lean body mass, a person will require to contrast and change their workouts by increasing either the load lifted or the number of reps or sets done. Complex movements are one way in which an individual can shape muscle efficiently. These contain weight lifts that comprise compound muscle groups, such as deadlifts, squats, and bench presses. To gain strength, one has to do weight training at least three times a week; this will be beneficial in achieving and preserving lean muscle mass. The present study revealed significant increases in the leg and chest presses through the intervention programs, which was also confirmed by the studies of Brechue and Abe (2002), Willoughby, et al. (2007), and Campbell et al. (2018) [21, 27, 28].

Inadequate caloric intake leads to leanness and anorexic personality, which may lead to many problems, especially if inadequate food intake is sustained for an extended period [29]. The negative consequences of inadequate food intake and anorexic frame can be observed in all age groups. This problem can be rectified with a supervised nutritious diet, proper hydration, liquid supplements, as well as vitamin and mineral supplements. In addition, anorexicism can be rectified by increased food intake and supervised physical activity [30]. Very few studies have focussed on these strata, but those of Mehler, et al. (2010) and Kaye, et al. (1988) emphasized that diet restoration involving high caloric and nutritious food along with strength training exercises reduce anorexic figure and lead to healthy weight gain [31, 32]. Our study endorsed the observations stated by the above researchers that increased food intake and strength training will result in gaining healthy weight for the anorexic population.

Conclusion

The present study indicated that anorexic subjects could improve their body mass and strength by adopting the proposed training intervention program in the exploration.

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