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Benefits of 8-week fitness programs in health and fitness parameters
Beneficios de programas de fitness de ocho semanas en parámetros de salud y condición física

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Abstract: considering the health and fitness improvements as main reasons for practice, the growing number of sport participants in health or fitness centers and the fitness trends for 2018, the aim of this work is to analyze the benefits of five different intervention groups with diet and without/with exercise program [G1) diet and no-exercise; G2) diet and weight training (WT); G3) diet and high intensity power training (HIPT); G4) diet and indoor cycling; G5) diet and boxing] in health and fitness parameters. Five groups were created and participants were evenly and randomly distributed (G1 to G5: n = 50; 25 f, 33.96 ± 3.42 years). In a first analysis, paired samples t test was used to compare each group, between pre-and post-test, at the dependent variables. In a second analysis, one-way ANOVA was used to compare the different groups, in pre-and post-test, also at the selected dependent variables, followed by a post-hoc continuation test when significant statistical differences between groups were detected. When the main reason for practice was loss of weight and fat mass, HIPT and boxing produced better results. For the increase of fat-free mass, WT presented better results. In fitness parameters, WT was the activity that presented better results in the increase of explosive lower strength and maximum upper strength, with significant statistical differences between the pre-and post-test. Fitness instructors can use this information to adapt, choose and prescribe healthy and adequate activities, according to the participants' main reasons for practice, therefore, increasing their perception of quality, satisfaction, adherence to exercise practice and loyalty intention.
Key words: body composition; diet; exercise workout; fitness program; strength; health education.

Resumen: considerando las mejoras de la condición física y salud como las razones principales de práctica de actividad física, así como el crecimiento del número de participantes en gimnasios o centros de fitness y sus tendencias durante el año 2018, el objetivo de este trabajo es analizar los beneficios de cinco grupos de intervención con dieta y sin/con un programa de ejercicio [G1) dieta sin ejercicio; G2) dieta y entrenamiento de fuerza (EF); G3) dieta y entrenamiento de potencia de alta intensidad (EPAI; HIPT en inglés); G4) dieta y ciclismo indoor; G5) dieta y boxeo] en los parámetros de aptitud física y la salud. Se crearon cinco grupos y los participantes fueron distribuidos aleatoriamente (desde G1 a G5: n = 50; 25 f, 33.96 ± 3.42 años). En un primer análisis, se utilizó el t test para muestras relacionadas para comparar cada grupo, en el pre- y post-test, en las variables dependientes. En un segundo análisis, se realizó un ANOVA de un factor para comparar entre diferentes grupos, en el pre- y post- test, también seleccionando las variables dependientes, y seguido por un test post-hoc cuando se detectaron diferencias significativas entre grupos. Cuando la principal razón de práctica de actividad física fue la pérdida de peso o masa grasa, el EPAI y el boxeo produjeron mejores resultados. Para el incremento de masa muscular, el EF presentó mejores resultados. En los parámetros de aptitudes físicas, el EF fue la actividad que presentó mejores resultados en el incremento de la menor fuerza explosiva y la mayor fuerza máxima, con diferencias estadísticamente significativas entre el pre-y post-test. Los monitores de fitness pueden usar esta información para adaptar, elegir y prescribir actividades físicas adecuadas y saludables, de acuerdo con las principales razones de práctica de los participantes y, por lo tanto, aumentar su percepción de cualidad, satisfacción, adhesión al ejercicio y nivel de fidelización.
Palabras clave: composición corporal; dieta; entrenamiento; programa de fitness; fuerza; educación para la salud.

Introduction

In Europe, health (54.0%) and fitness (47.0%) improvements are the two main reasons for sport practice (European Commission, 2018). In Spain, according to the same study, health improvement is the main reason for practice which presents the highest value (59.0%) and, although these similar results with the rest of Europe, fitness improvement presents a lower value (38.0%). In the specific area of fitness, for the participants of health or fitness centers, health and fitness improvements are also the most important reasons presented in the studies of Damásio, Campos, and Gomes (2016), Fermino, Pezzini, and Reis (2010) and Liz, Viana, Dominsky, and Andrade (2018).

The analysis of the Sport and Physical Activity Report (European Commission, 2018) also indicates that health or fitness centers are one of the preferred places (15.0%) where European sport participants engage in sport or physical activity. In Spain, this value is higher, with 18.0% of the sport participants choosing this place for practice. Comparing these results (European Commission, 2010; 2014), it is possible to conclude that sport participation in health or fitness centers is growing (11.0% in 2010 and 15.0% in 2014), especially in Spain, with an increase of 7.0% in eight years (European Commission, 2010; 2014; 2018).

Since 2006, the American College of Sports Medicine (ACSM) has administered a global survey about the fitness trends for the following year. Veiga, Valcarce, and King (2017) tried to find the fitness trends for 2017 in Spain, and Veiga, Valcarce, King, and Cámara (2018) for 2018. In summary, Spain's fitness trends do not differ too much from the international main trends (16 of the 20 first fitness trends are the same) (Veiga, et al., 2017) and, from 2017 to 2018, the Spanish trends remained (17 coincident trends) (Veiga, et al., 2018).

For the above, considering the main reasons to practice any sport or physical activity (health and fitness) (Damásio, et al., 2016; European Commission, 2018; Fermino, et al., 2010), the growing number of sport participants in health or fitness centers (European Commission, 2018) and the fitness trends for 2018 (Veiga, et al., 2018) in a specific context (Spain), the objectives of this investigation were: (1) analyze the benefits of different 8-week fitness programs on health parameters (weight, fat mass, fat-free mass); and (2) analyze the benefits of different 8-week fitness programs on fitness parameters (maximum upper strength, explosive lower strength). These health and fitness parameters were selected from the ACSM (2017) guidelines for exercise testing and prescription, and the research methodology followed in similar and recent studies (Grenlee, et al., 2017; Hermassi, et al., 2017; Illán, et al., 2018; Oliveira, et al., 2017; Savkin & Aslan, 2017; Scotto di Palumbo, Guerra, Orlandi, Bazzucchi, & Sacchetti, 2017).

Methods

Participants

Individuals who participated in the study were submitted to a program composed by diet without/with exercise. Five intervention groups were formed. Fitness activities were included in four of the groups, with fitness programs selected taking into consideration the fitness trends of Spain in 2018 (Veiga, et al., 2018): weight training (WT) and high intensity power training (HIPT), related with the hierarchically top fitness trends; indoor cycling, as one of the most expressive and practiced group fitness activities; and boxing, as one of the oldest practiced activities in this context, also for being in the genesis

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of the modern fitness/health center facilities and practiced by a market niche.

In the first intervention group (G1) the program included only diet and no-exercise training [G1) diet and no-exercise]. In the other intervention groups (G2 to G5), complementary to the diet, the participants had to follow an exercise training subprogram, composed by the previous referred fitness activities [G2) diet and WT; G3) diet and HIPT; G4) diet and indoor cycling; G5) diet and boxing].

Participants were recruited through the fitness/health centers of *Centros Deportivos MADA SPORT SL* (MADA SPORT SL Sportive Centers) of *Comunidad Autónoma de Madrid* (Autonomous Communities of Madrid), by announcements in different clubs. Of the 340 fitness participants who voluntarily wanted to participate in this investigation, 50 were randomly selected and distributed among the five intervention groups. The participants were eligible for the study if they: (a) had no current or recent (within the past two months) use of medication that could affect the central nervous system (CNS) or the ability to exercise in a safe way; (b) had no medical, psychological or physiological conditions affecting the CNS or the ability to exercise in a safe way; (c) were between 25-40 years old; (d) had not recent exercise and/or training experience in the last year (neither any sport practice or regular practice); (e) had more than 25% fat mass; and (f) were willing to comply strictly with the proposed fitness program.

The fitness participants selected to integrate this study (G1 to G5: n = 50; 25 f, 33.96 ± 3.42 years) were divided in five intervention groups [G1 (diet and no-exercise): n = 10; 5 f, 35.30 ± 3.36 years. G2 (diet and WT): n = 10; 5 f, 33.90 ± 3.34 years. G3 (diet and HIPT): n = 10; 5 f, 33.70 ± 3.46 years. G4 (diet and indoor cycling): n = 10; 5 f, 32.50 ± 3.56 years. G5 (diet and boxing): n = 10; 5 f, 34.40 ± 3.43 years].

Measures

The assessment was done following the chronological sequence listed below: (1) body composition measurements [(height (m), weight (kg), fat mass (%), fat-free mass (kg)], using a stadiometer (height) and a bioelectrical impedance scale (weight, fat mass, fat-free mass); (2) explosive lower strength (cm), using countermovement jump (CMJ); (3) maximum dynamic upper strength (kg), using bench press 1RM. These measure tests, and respective protocols, were recommended, used and described in the studies of Grenlee et al. (2017), Hermassi et al. (2017) and Rey, Vallier, Nicol, Mercier, and Maïano (2017).

Procedures

For the assessment of health and fitness parameters, all participants performed the same tests before and after the 8-week intervention program. The pre-test was conducted during the week before the beginning and the post-test was carried out the week after the end of the program. In the assessment days, all participants were asked to consume a typical meal at least 2-3 hours before scheduled testing time. Moreover, all the assessment sessions (pre-test and post-test) were conducted under the same conditions and at the same time of the day. Most of the participants were already familiar with the tests in the assessment protocol. Those who were not familiar were familiarized before the test and, only after that, data was collected.

The diet subprogram was similar for all the groups, considering the participants' basic metabolic rate (BMR) as well as their personal and professional activity energy expenditure. It was balanced and healthy, made by a nutritionist. In the exercise subprogram, although fitness activities were different between groups, all the participants from G2 to G5 were submitted to an 8-weeks exercise training program, from February 13th to April 7th of 2017, with three sessions of 60 minutes per week, in a global 24 training sessions, with at least 48 hours of rest between each exercise session.

G1 included only diet and no-exercise training. G2 included diet and a classic WT for hypertrophy goals. The intensity of each session was between 50.0% to 90.0% of the one repetition maximum (1RM) and two muscle groups were combined per session. Each session included seven different exercises with 3-4 sets and 6-15 repetitions per exercise. G3 made the diet and HIPT, a HIIT specific method, which combined cardiovascular high intensity levels, strength and power training, to submaximum and maximum intensities. G4 made the diet and indoor cycling: a group training activity, predominantly aerobic (resistance training), performed in a special indoor bike, combining moderate and maximum high intensities using a continuous or interval training methodology. Finally, G5 made the diet and boxing, a combat sport where the different techniques are performed in periods of three minutes (at maximum intensity) with two minutes of rest between each block of practice (round), using submaximum and maximum intensities.

Statistical analysis

In this study, the 8-week intervention programs [1) diet and no-exercise, 2) diet and WT, 3) diet and HIPT, 4) diet and indoor cycling, and 5) diet and boxing] was defined as factors (independent variables). On the other hand, health measurements of body composition [1) weight, 2) fat mass, and 3) fat-free mass], as well as fitness measurements of lower explosive strength and upper maximum strength [1) CMJ, and 2) 1RM] were defined as dependent variables.

In the first analysis, the paired samples *t* test was used to compare each group, between pre-and post-test, at the dependent variables, after validating normality and homogeneity assumptions. In the second analysis, the one-way ANOVA was used to compare the different groups, at pre-and post-test, also at the dependent variables and after validating normality and homogeneity assumptions. When the one-way ANOVA test detected significant statistical differences between the groups, Tukey's HSD post-hoc test was used when the assumption of homogeneity was verified (Pallant, 2011). When homogeneity was not observed, Games-Howell test (Shingala & Rajyaguru, 2015) was used.

A preliminary analysis was made to ensure no violation of normality with Shapiro-Wilk (O'Donoghue, 2013) and Levene's test for equality of variances (Pallant, 2011). If a non-verification of normality occurs, the following equation was used to analyze symmetry (Ghasemi & Zahediasl, 2012):

$$\left|\frac{Skewness}{Std\ error\ Skewness}\right| \leq 1.96$$

The effect size (ES) was presented as η^2 for one-way ANOVA test and interpreted using the follow criteria: no effect (< 0.04), minimum effect (0.04 d• < 0.25), moderate effect (0.25 d• < 0.64) and strong effect (e• 0.64) (Ferguson, 2009). For the case of paired samples *t* test, Cohen's *d* was executed as ES measure using the follow criteria: small effect (*d* < 0.20), moderate effect (0.20 d• *d* < 0.80), and large effect (*d* e• 0.80) (O'Donoghue, 2013). Data analysis was conducted using the IBM SPSS© (version 24.0) software for Microsoft Windows©, and a statistical significance of 5% (p < .05) was defined.

Results

Tables 1 and 2 presents the descriptive analysis [mean (M) and standard deviation (SD) values in pre-test and post-test intervention program] for each group. Apart from these data, and for each group, mean difference (MD) and *p* value are presented to verify, respectively, whether there is a loss or an increase of values, considering the dependent variables, and significant statistical differences as a result of the program for each dependent variable. Table 1 shows the results of body composition measurements (health) and Table 2 shows explosive lower strength and maximum upper strength measurements (fitness).

Considering the weight variable, there is a loss in all programs, where G3 (MD = -8.53) stands out. There are significant statistical differences between pre-and post-test in all the groups [G1: $t(9)$ = 3.73; p = .005; d = 0.24; moderate effect size. G2: $t(9)$ = 3.15; p = .012; d = 0.21; moderate effect size. G3: $t(9)$ = 13.49; p = .001; d = 1.14; large effect size. G4: $t(9)$ = 8.46; p = .001; d = 0.42; moderate effect size. G5:

Table 1.
Descriptive statistics of the body composition measurements (health evaluation)

G	Weight (kg)						Fat Mass (%)						Fat-free Mass (kg)					
	Pre		Post		MD	*p*	Pre		Post		MD	*p*	Pre		Post		MD	*p*
	M	SD	M	SD			M	SD	M	SD			M	SD	M	SD		
G1	87.26	7.60	85.52	7.02	-1.74	.005*	32.00	0.97	28.75	2.10	-3.25	.001*	54.13	6.74	54.77	6.69	0.64	.004*
G2	84.32	18.72	80.69	16.25	-3.63	.012*	28.17	3.20	25.07	1.95	-3.10	.001*	54.15	16.70	59.62	14.77	5.47	.001*
G3	82.87	7.60	74.34	7.28	-8.53	.001*	27.79	1.86	19.27	1.19	-8.52	.001*	56.80	1.32	61.28	0.70	4.48	.001*
G4	83.33	10.58	79.16	9.43	-4.17	.001*	27.04	1.07	25.10	1.94	-1.94	.002*	52.89	9.02	57.35	8.35	4.46	.001*
G5	82.67	9.21	75.58	8.69	-7.09	.001*	28.98	2.22	22.43	1.72	-6.55	.001*	51.69	8.69	57.15	8.41	5.46	.001*

* Significant statistical differences for p < .05.

Table 2.
Descriptive statistics of the strength measurements (fitness evaluation)

G	Explosive Lower Strength (cm)						Maximum Upper Strength (kg)					
	Pre		Post		MD	*p*	Pre		Post		MD	*p*
	M	SD	M	SD			M	SD	M	SD		
G1	18.30	2.41	19.20	3.05	0.90	.029*	44.20	13.09	43.70	13.03	-0.50	.521
G2	18.60	2.55	25.70	3.86	7.10	.001*	53.30	22.12	68.50	24.69	15.20	.001*
G3	20.00	3.37	25.55	5.00	5.55	.003*	49.90	15.60	58.30	16.58	8.40	.001*
G4	19.30	2.91	21.70	2.87	2.40	.001*	51.50	17.13	50.60	17.10	-0.90	.350
G5	19.90	3.38	23.00	3.60	3.10	.001*	48.10	17.14	50.90	16.23	2.80	.027*

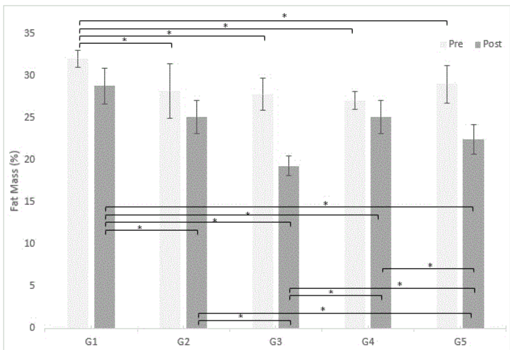
* Significant statistical differences for p < .05.

t(9) = 15.14; *p* = .001; *d* = 0.79; moderate effect size].

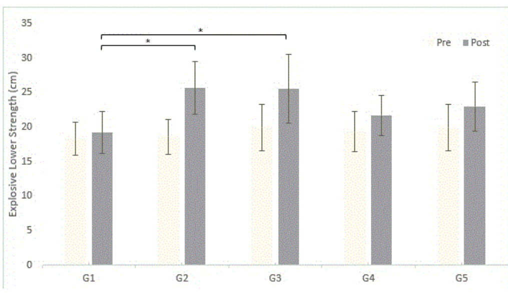
Regarding the fat mass variable, there is also a loss in all programs, where G3 (MD = -8.52) stands out again. There are significant statistical differences between pre-and post-test in all groups [G1: *t*(9) = 5.96; *p* = .001; *d* = 1.99; large effect size. G2: *t*(9) = 5.68; *p* = .001; *d* = 1.17; large effect size. G3: *t*(9) = 20.40; *p* = .001; *d* = 5.45; large effect size. G4: *t*(9) = 4.19; *p* = .002; *d* = 1.23; large effect size. G5: *t*(9) = 14.35; *p* = .001; *d* = 3.30; large effect size].

Lastly, in the fat-free mass variable there is an increase in all programs, where G2 (MD = 5.47) and G5 (MD = 5.46) stands out. Like in the previous presented variables, there are significant statistical differences between pre-and post-test in all of the groups analyzed [G1: *t*(9) = -3.88; *p* = .004; *d* = 0.10; small effect size. G2: *t*(9) = -5.50; *p* = .001; *d* = 0.35; moderate effect size. G3: *t*(9) = -10.10; *p* = .001; *d* = 4.31; large effect size. G4: *t*(9) = -11.10; *p* = .001; *d* = 0.51; moderate effect size. G5: *t*(9) = -34.43; *p* = .001; *d* = 0.64; moderate effect size].

Considering the explosive lower strength variable, there is an increase in all programs, where G2 (MD = 7.10) stands out. There are significant statistical differences between pre-and post-test in all the analyzed groups [G1: *t*(9) = -2.59; *p* = .029; *d* = 0.33; moderate effect size. G2: *t*(9) = -9.84; *p* = .001; *d* = 2.17; large effect size. G3: *t*(9) = -4.01; *p* = .003; *d* = 1.30; large effect size. G4: *t*(9) = -7.06; *p* = .001; *d* = 0.36; moderate effect size. G5: *t*(9) = -7.15; *p* = .001; *d* = 0.89; large effect size].



* Significant statistical differences for p < .05.
Figure 1. Multiple comparison between the groups (Pre-test and Post-test) in Fat Mass



* Significant statistical differences for p < .05.
Figure 2. Multiple comparison between the groups (Post-test) in Lower Strength

Finally, regarding the maximum upper strength variable, there is an increase in G2, G3 and G5, and a loss in G1 and G4. In this case, a positive highlight goes to G2 (MD = 15.20). There are significant statistical differences between pre-and post-test in G2, G3 and G5 groups [G2: *t*(9) = -9.96; *p* = .001; *d* = 0.65; moderate effect size. G3: *t*(9) = -7.58; *p* = .001; *d* = 0.52; moderate effect size. G5: *t*(9) = -2.64; *p* = .027; *d* = 0.17; small effect size].

In the second analysis (comparison between the groups, in pre-and post-test), at the pre-test, it was possible to verify that there were no significant statistical differences in weight among the groups [*F*(4;45) = 0.27; *p* = .897; = 0.02; no effect size], fat-free mass [*F*(4;45) = 0.37; *p* = .826; = 0.03; no effect size], explosive lower strength [*F*(4;45) = 0.66; *p* = .621; = 0.06; minimum effect size] and maximum upper strength [*F*(4;45) = 0.41; *p* = .802; = 0.04; minimum effect size]. On the other hand, there are statistical differences in the fat mass [*F*(4;45) = 8.93; *p* = .001; = 0.44; moderate effect size]. By multiple comparison with the Games-Howell post-hoc test, it is possible to verify where the statistical differences occur (Figure 1) and its values of significant statistical mean differences (Table 3).

Also, as part of the second analysis (post-test), it was possible to verify that there were no significant statistical differences between groups in the weight [*F*(4;45) = 1.86; *p* = .135; = 0.14; minimum effect size], fat-free mass [*F*(4;45) = 0.77; *p* = .549; = 0.06; minimum effect size] and maximum upper strength [*F*(4;45) = 2.76; *p* = .052; = 0.20; minimum effect size] variables. There are statistical differences in fat mass [*F*(4;45) = 37.88; *p* = .001; = 0.77; strong effect size] and explosive lower strength [*F*(4;45) = 5.34; *p* = .001; = 0.32; moderate effect size]. By multiple comparison of the Tukey HSD post-hoc test, it was possible to verify where the statistical differences occur [fat mass (Figure 1); explosive lower strength (Figure 2)]. The values of statistical significance in the mean differences are shown in Table 3.

As it was previously referred, Table 3 presents the values of statistical significance in the mean differences after the application of the recommended post-hoc test, in fat mass and explosive lower strength variables.

Table 3.
Multiple comparison using post-hoc tests (Tukey HSD or Games-Howell)

Dependent Variable	Fitness Program	Post-hoc Test	Group (A)	Group (B)	MD (A-B)	*p*
Fat Mass	Pre-test	Games-Howell	G1	G2	3.83*	.028
				G3	4.21*	.001
				G4	4.96*	.001
				G5	3.02*	.013
	Post-test	Tukey HSD	G1	G2	3.68*	.001
				G3	9.48*	.001
				G4	3.65*	.001
				G5	6.32*	.001
			G2	G3	5.80*	.001
				G5	2.64*	.017
			G3	G4	-5.83*	.001
				G5	-3.16*	.001
			G4	G5	2.68*	.015
Explosive Lower Strength	Post-test	Tukey HSD	G1	G2	-6.50*	.003
				G3	-6.35*	.004

* Significant statistical differences for p < .05.

Table 3 shows that, in the fat mass dependent variable, significant statistical mean differences occur between G1 and G2 (*p* = .028), G3 (*p* = .001), G4 (*p* = .001) and G5 (*p* = .013). G1 has higher values of fat mass, when comparing with other groups, at the beginning of the fitness program. In the post-test evaluation, the significant statistical mean differences occur between G1 and G2 (*p* = .001), G3 (*p* = .001), G4 (*p* = .001), G5 (*p* = .001); between G2 and G3 (*p* = .001), G5 (*p* = .017); between G3 and G4 (*p* = .001), G5 (*p* = .001); and, finally, between G4 and G5 (*p* = .015). Generally, G1 presents higher values of fat mass after the intervention program, and G3 presents the lower values.

Also, post-test assessment of the explosive lower strength variable showed significant statistical mean differences between G1 and G2 (*p* =

.003) and G3 (p = .004), presenting G1 lower values of explosive lower strength after the intervention program.

Discussion

Considering the objectives of this investigation [(1) analyze the benefits of different 8-week fitness programs in health parameters (weight, fat mass, fat-free mass); (2) analyze the benefits of different 8-week fitness programs in fitness parameters (maximum upper strength, explosive lower strength)], the discussion will be organized in two analyzes. Concerning the first analysis (the benefits provided for each one of the different programs), it was possible to verify that:

(1) Health

Through p and MD values, it was possible to conclude that all the programs in this work presented significant results in the loss of weight, being HIPT (p = .001; MD = -8.53) and boxing (p = .001; MD = -7.09) the fitness activities with greater weight loss, when compared with the three-other studied intervention programs.

These results seem to conclude that when the main reason for practice is the loss of weight, these are the kind of activities that the fitness instructor should consider and recommend to their participants, in order to reach their goals in a faster and easier way.

This detail could provide better satisfaction and, consequently, increase their fitness participants' loyalty (Campos, Martins, Simões, & Franco, 2017).

The data also presented significant results in the loss of fat mass and in the increase of fat-free mass.

For the loss of fat mass, as in the case of weight loss, HIPT (p = .001; MD = -8.52) and boxing (p = .001; MD = -6.55) were the fitness activities which presented better results. For the increase of fat-free mass, beyond boxing (p = .001; MD = 5.46) and HIPT (p = .001; MD = 4.48), present in the other health assessments (weight; fat mass), WT (p = .001; MD = 5.47) and indoor cycling (p = .001; MD = 4.46) presented also similar higher results.

The fitness program with better results in the increase of fat-free mass seems to be WT. As it is observed above in weight loss previous example, it is important that the fitness instructor arrange and prescribe activities in accordance with the participants' goals (Campos, Martins, et al., 2017).

The results seem to confirm the studies of Rey et al. (2017) and Stoner et al. (2016), even with different characteristics and in a different context [5-week vigorous interval training program, combined with healthy diet, improves body composition (weight and fat mass percentage, among others) in obese adolescents (Rey, et al., 2017); exercise intervention, in overweight and obese adolescents, results in worthwhile improvements in body composition, particularly in fat mass (Stoner, et al., 2016)].

(2) Fitness

Also, analysis of p and MD values, confirm that all the studied intervention programs present significant results in the increase of explosive lower strength, being WT (p = .001; MD = 7.10) and HIPT (p = .003; MD = 5.55) the fitness activities where the increase of explosive lower strength was higher, compared with 3-other studied programs.

In G1 (only diet and no-exercise), even with no practice of any fitness activity, the results allowed to verify that this program intervention was significant (p = .029; MD = 0.90).

With this, it is possible to conclude that a program intervention based only on a diet subprogram could improve participants' levels of explosive lower strength.

The most non-consensual results of this study are in the maximum upper strength variable. Three of five intervention programs presented significant results in the increase of the maximum upper strength [WT (p = .001; MD = 15.20), HIPT (p = .001; MD = 8.40) and boxing (p = .027; MD = 2.80)], being these activities the most recommended when the participants' goals are related with this. In an opposite tendency, like previously referred, indoor cycling (p = .350; MD = -0.90) and only diet and no-exercise (p = .521; MD = -0.50) were the only programs where there were no significant differences between the pre-test and post-test assessment, presenting a loss of maximum upper strength in the end of the intervention program.

These results allow to conclude that, if the main objectives of the participants are related with the increase of this fitness parameter (maximum upper strength), the instructor should avoid the prescription of these activities (diet and indoor cycling; only diet and no-exercise) in order to maintain their perception of quality, satisfaction and loyalty intention (Campos, Martins, et al., 2017).

Indoor cycling, although it may be a high-intensity fitness activity (Barbado, Foster, Vicente-Campos, & López-Chicharro, 2017), can improve also health parameters (Valle, Mello, Fortes, Dantas, & Matos, 2010), in weight and fat mass percentage (among others). However, if the main objective of the fitness participant is an increase in maximum upper strength, this activity must be replaced by another (e.g., WT, HIPT).

Globally, these results seem to confirm the researches of Crawley, Sherman, Crawley, and Cosio-Lima (2016), Edholm, Strandberg, and Kadi (2017), Hermassi et al. (2017), Rey et al. (2017) and Talpey, Young, and Saunders (2016) [some individual parameters of physical fitness showed evidence of improvement in the first eight weeks of a physical training program (Crawley, et al., 2016); a resistance training, combined with a healthy diet, can optimize the effects of dynamic explosive strength during isolated lower limb movements (Edholm, et al., 2017); additional strength training twice a week enhances the maximal strength of the lower limbs and jumping performance (Hermassi, et al., 2017); a 5-week vigorous interval training, combined with healthy diet, improves physical fitness in obese adolescents (Rey, et al., 2017); over nine weeks training, lower body explosive muscle function and jump performance improved significantly (Talpey, et al., 2016)].

Through a second analysis (comparison between the groups, in pre-and post-test), and only considering the dependent variables where the significant statistical differences occur (Table 3), it was possible to confirm that:

(1) Health

Even before the intervention program, there were statistical differences in the fat mass variable between G1 and the other groups (G2, G3, G4 and G5), having G1 the higher values in the beginning of the intervention programs.

This data analysis allows to understand that, even using a random distribution of the participants, there were significant statistical differences between the groups in the beginning of the intervention programs.

Although, it is important to refer that in the end of the different programs (post-test), the significant differences occurred, not only on the previously referred groups, but among all the groups.

Through the analysis of the MD, it is possible to conclude that G1 was the group that presented higher values of fat mass (in the end of 8-week program) and the diet and HIPT (G3) was the group that presented lower values, settling the importance of physical activity as a complement of a healthy diet to obtain more health benefits (World Health Organization, 2015).

These results allow to conclude that the HIPT (G3) was the fitness activity that promoted a higher loss of fat mass and only diet, with no-exercise practice (G1), was the intervention program that promoted the lowest loss of fat mass, confirming the studies of Rey et al. (2017) [5-week vigorous interval training program (combined with healthy diet) improves fat mass percentage in obese adolescents].

(2) Fitness

In explosive lower strength, after the intervention program (post-test), it is possible to verify that there were significant differences between G1 and G2, and G1 and G3. Additionally, G1 showed lower values when compared with other groups (G2 and G3).

Through MD analysis, it is possible to conclude that only diet and no-exercise (G1) was the group which presented minor explosive lower strength values at the end of the intervention program and the diet and

WT (G2) was the group which presented the higher values.

These results allow to conclude that WT (G2) was the fitness activity that promoted a higher increase in explosive lower strength, followed by similar results with HIPT (G3), and only diet with no-exercise practice (G1) as the studied program that promoted the lower increase, confirming the studies of Edholm et al. (2017), Hermassi et al. (2017) and Talpey et al. (2016) [resistance training, combined with a healthy diet, can optimize the effects of dynamic explosive strength during isolated lower limb movements (Edholm, et al., 2017); additional strength training, twice a week, enhances the maximal strength of the lower limbs and jumping performance (Hermassi, et al., 2017); over nine weeks, lower body explosive strength and jump performance improved significantly (Talpey, et al., 2016)].

The investigation about fitness quality service has been part of our recent scope of investigation (Campos, Martins, et al., 2017; Campos, Simões, & Franco, 2017; Damásio, et al., 2016). Although in different contexts (quality of the group exercise instructor) this thematic reveal its importance considering their multiple practical applications.

Health and fitness centers and, by inherence, the fitness instructors, could have a specific and critical role in the service delivery and (with that) a positive contribution to service quality improvement (Chiu, Cho, & Won, 2015). With that, it is important to provide a service that is thought and prepared considering, for example, the participants' main reasons for practice. An educated, certified and experienced fitness professional (Thompson, 2016; Veiga, et al., 2018) understands, prepares and acts considering the main reasons for practice, the characteristics and/or preferences of their own participants.

The practical application of the present study is that, in accordance with the two main reasons for sport practice (health and fitness improvements), the fitness instructor has scientific results that allow to understand which fitness exercise activities could produce more benefits in body composition (health) and strength (fitness) parameters. With this knowledge, it is possible to adapt their own intervention, choosing and prescribing the adequate fitness activities, taking in account their participants' main reasons for practice and, with that increase their perception of quality, satisfaction, adherence to exercise practice and loyalty intention (Campos, Martins, et al., 2017).

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