

Muscle dysmorphia, body image disturbances and commitment to exercise: A comparison between sedentary and physical active undergraduate men

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Abstract:

This study compared muscle dysmorphia symptoms, body image disturbances (body dissatisfaction, drive for muscularity and body-ideal internalization) and commitment to exercise between sedentary and physical active subjects. For this, we evaluated 265 undergraduate men (22.4±3.7 yrs.). The following measures were applied: sociodemographic data, Muscle Dysmorphia Disorder Inventory (muscle dysmorphia), Male Body Dissatisfaction Scale (body dissatisfaction), Drive for Muscularity Scale (drive for muscularity), Sociocultural Attitudes Towards Appearance Questionnaire-3 (body-ideal internalization) and Commitment to Exercise Scale (commitment to exercise). Participants were classified as sedentary, physically active (frequency ranging between one to four times a week) and very active (frequency five times a week or more). Analysis of variance (ANOVA one-way), followed by Tukey post hoc showed significant differences between sedentary and physically very active groups on body dissatisfaction (5.7±1.1 and 5.2±1.0 a.u.; $p = .042$), drive for muscularity (27.3±10.0 and 33.5±12.1 a.u.; $p = .001$) and commitment to exercise (259.9±199.6 and 536.3±216.6 a.u.; $p = .001$). Difference was also observed between active and very active groups, but only to commitment to exercise (440.9±214.2 and 536.3±216.6 a.u.; $p = .001$). Our results showed that drive for muscularity and commitment to exercise is higher in very active when compared to sedentary subjects. However, sedentary group manifested higher body dissatisfaction than very active. Very active undergraduate men showed higher commitment to exercise than active and sedentary did. Finally, no differences were observed between groups for muscle dysmorphia symptoms and body-ideal internalization. In conclusion, our data add information to the scientific debate demonstrating that there are differences between physically active and sedentary subjects regarding body image disturbances and commitment to exercise. Body dissatisfaction, drive for muscularity and commitment to exercise vary between sedentary and active subjects, and appears to be dose dependent.

Key words: exercise, body dysmorphic disorder, body dissatisfaction, exercise dependence, young men.

Introduction

Muscle dysmorphia is a psychopathology belonging to the spectrum of the body dysmorphic disorders characterized by an excessive concern to be small and weak, even when the subject is large and muscular (Pope Jr, Gruber, Choi, Olivardia, & Phillips, 1997; Pope Jr, Katz, & Hudson, 1993). This psychopathology has gained prominence among researchers interested in the study of male body image concerns, body dissatisfaction and physical appearance investment. Recent studies indicate that cognitions and body-related behaviours as well as eating disturbances differ significantly between men and women (Murray et al., 2017). In addition to body weight and shape concerns, which are generally presented by women and considered central aspects of eating disorders such as anorexia and bulimia nervosa, men show higher drive for muscularity and specific concern to acquire a muscular physique, with emphasis on certain parts of the body, such as shoulders, chests and arms (Cafri, Yamamiya, Brannick, & Thompson, 2005; Murray et al., 2017). The ideal male body is currently characterized by a muscular upper-body and a low body fat index, in other words, a muscular and defined body. Thus, men desire a lean and muscular body, which is consistent with novel finds regarding the increased prevalence of muscularity oriented eating disorders and muscle dysmorphia among men (Murray et al., 2017).

Recent research aimed to assess the similarity between attitudinal and behavioural aspects present in patients with eating disorders and subjects with symptoms of muscle dysmorphia (Murray et al., 2012). Among the nosological presentation of these psychopathologies are similarities in body weight and shape concerns,

disordered eating behaviours, use of substances for body change and dysfunctional physical exercise practice. With regard to muscle dysmorphia, it is necessary to emphasize that patients adopt rigid behaviours in relation to social and professional activities, besides rigid diets and exercise dependence (Pope, Pope Jr, Menard, Fay, Olivardia, & Phillips, 2005).

Exercise within the recommended intensity and volume seems to be associated with low levels of body image disturbances (i.e., body dissatisfaction) (Bassett-Gunter, McEwan, & Kamarhie, 2017; Hausenblas & Fallon, 2006). However, some subjects may engage in inappropriate and excessive exercise with a focus on physical appearance changes (Meyer, Taranis, Goodwin, & Haycraft, 2011). The dysfunctional practice of physical exercise has been called “compulsive exercise” (Pasman & Thompson, 1988) or “exercise dependence” (Veale, 1987), and involves a routine of physical activities of high frequency and duration, with an impulse to practice exercises even in situations of injury, fatigue or tiredness (Davis, Kennedy, Ravelski, & Dionne, 1994; Taranis, Touyz, & Meyer, 2011). Compulsive exercise seems to be associated with eating disorders, since exercise can lead to body weight loss or body weight control (Bassett-Gunter et al., 2017). Moreover, compulsive exercise can also lead to impairment of occupational opportunities and social relationships, as is the case of patients with muscle dysmorphia (Pope Jr et al., 1997). Due to the aforementioned issues, the term most commonly used to describe the dysfunctional relationship to the exercise is commitment to exercise (Teixeira, Hearst, Matsudo, Cordás, & Conti, 2011).

Systematic reviews and meta-analysis indicate that high-performance athletes have a higher prevalence of eating disorders than non-athletes (Rice, Purcell, De Silva, Mawren, McGorry, & Parker, 2016; Ströhle, 2018), the same occurring for symptoms of muscle dysmorphia (Mitchell et al., 2017) and body image disturbances (Rice et al., 2016). In summary, athletes present a higher prevalence of psychopathologies such as muscle dysmorphia and eating disorders, as well as greater body dissatisfaction, considered the greatest risk factor for the development of these pathologies. However, there are still scientific gaps regarding possible differences between active and sedentary non-athletes. In other words, a large part of the studies conducted compared athletes and non-athletes, without investigating whether the prevalence or subclinical presentations of muscle dysmorphia, body image disturbances and commitment to exercise differ between sedentary, active or very active non-athletes.

Sociocultural model indicates that body ideals propagated by sociocultural agents (parents, peers and media) tend to be internalized by the subjects, which can cause body image disturbances and the adoption of deleterious behaviours such as restrictive eating, purging, fasting, use of anabolic steroids and dietary supplements, as well as compulsive exercise (Carvalho, Alvarenga, & Ferreira, 2017). Therefore, it is possible that physically active non-athletes present higher body image disturbances, symptoms of muscle dysmorphia and elevated degree of psychological commitment to exercise when compared to sedentary or less active non-athletes. Thus, this study aimed to compare muscle dysmorphia symptoms, body image disturbances (body dissatisfaction, drive for muscularity and body-ideal internalization) and commitment to exercise between sedentary and physically active individuals (the latter composed by two groups: active and very active). Our hypothesis are: (i) active and very active groups will present a greater body dissatisfaction, body-ideal internalization, muscle dysmorphia symptoms and also higher commitment to exercise when compared to sedentary group; (ii) very active group will show higher scores in all measures evaluated when compared with active and sedentary groups.

Material & methods

Participants & Procedures

Undergraduate men, aged between 18 and 35 years old, from two higher education institutions in Brazil responded to a set of self-report instruments. We included all those who voluntarily wanted to participate and who signed an Informed Consent Term. Subjects who failed to complete any of the instruments applied were excluded from the survey.

The Institutional Research Ethics Committee approved the study (CAAE: 68155517.2.0000.5147, protocol number 2.138.995). All procedures are in accordance with the principles of the Helsinki Declaration and the norms of Resolution number 196/96 of the National Health Council, Brazil. Directors of two higher education institutions were contacted to provide the authorization to carry out the research. Teachers were contacted by e-mail and scheduled day and time for application of the instruments. The questionnaires were applied during the classes, individually, without time limit.

Measures

Muscle dysmorphia symptoms. To evaluate muscle dysmorphia symptoms the Muscle Dysmorphia Disorder Inventory - MDDI (Hildebrandt, Langenbucher, & Schlundt, 2004) was applied. MDDI consists of 13 items with a 6-point Likert scale (0 = *Never* to 5 = *Always*) and total score vary from 0 to 78 points. The higher the score the greater muscle dysmorphia symptoms. The inventory is composed of three factors: *Drive for size*

(e.g., “I think my body is too small”), *Appearance intolerance* (e.g., “I wear loose clothing so that people cannot see my body”) and *Functional impairment* (e.g., “I feel anxious when I miss one or more workout days”). The Brazilian version of the MDDI was used and to the present sample the estimated internal consistency (Cronbach’s α) correspond to .74.

Body dissatisfaction. The Male Body Dissatisfaction Scale - MBDS (Ochner, Gray, & Brickner, 2009) was used as a measure of male body dissatisfaction. The MBDS comprises 25 items, answered in a 5-point Likert scale (1 = *Always/Strongly agree* to 5 = *Never/Strongly disagree*; Step A). In addition, another sequential evaluation (Step B) is used considering the degree of importance given to each item ranging from 1 (*Whitout importance*) to 10 (*Great importance*). The MBDS was cross-culturally adapted and psychometrically evaluated for the Brazilian population by Carvalho, Conti, Neves, Meireles, Oliveira and Ferreira (2015). Latter, a reduced version of the scale was tested by Silva, Marôco, Ochner and Campos (2017) and presented good psychometric properties with only 12 items and two factors: *Musculature* (e.g., “Others would find me more attractive if I had more muscle”) and *General body appearance* (e.g., “I think I have a generally attractive body”). Total score was calculated using equation proposed by Silva et al. (2017). For the present sample, the estimated internal consistency of the MBDS was .71.

Drive for muscularity. To evaluate the drive for muscularity, the Drive for Muscularity Scale - DMS (McCreary & Sasse, 2000) was applied. It consists of 15 items with 6-point Likert scale (1 = *Always* to 6 = *Never*). Brazilian version of the DMS consists of 12 of the original 15 items (Campana, Tavares, Swami, & da Silva, 2013). It is composed of two factors: *Muscularity oriented body image* (e.g., “I think that I would feel stronger if I gained a little more muscle mass”) and *Muscularity oriented behaviour* (e.g., “I try to consume as many calories as I can in a day”). Total score vary from 12 to 72 points. Scores were reversed so that the higher the score the greater the drive for muscularity. Estimated internal consistency of the DMS in the present study correspond to .85.

Body-ideal internalization. The Sociocultural Attitudes Toward Appearance Questionnaire- 3 - SATAQ-3 (Thompson, Van Den Berg, Roehrig, Guarda, & Heinberg, 2004) was used as a measure of male body-ideal internalization. The SATAQ-3 comprises 30 items, answered in a 5-point Likert scale (1 = *Strongly disagree* to 5 = *Strongly agree*). The SATAQ-3 has four factors: *General internalization* (e.g., “I would like my body to look like the people who are on TV”), *Athletic internalization* (e.g., “I compare my body to that of people who are athletic”), *Pressure* (e.g., “I’ve felt pressure from TV or magazines to look pretty”) and *Information* (e.g., “TV programs are an important source of information about fashion and being attractive”). The version validated for use with young Brazilian men was used, which has been shown to have appropriate psychometric qualities (Amaral, Ribeiro, Conti, Ferreira, & Ferreira, 2013). Only two factors were used: *General internalization* and *Athletic internalization*. In the present study, the SATAQ-3 showed α equal to .94 e .71, respectively.

Commitment to exercise. To evaluate commitment to exercise the Commitment to Exercise Scale - CES (Davis, Brewer, & Ratusny, 1993) was applied. The CES is a visual analogue type scale composed of eight questions that refer to the subjects' commitment, behaviour and attitudes towards physical exercise (e.g., “How important do you think it is to your general well-being not to miss your exercise sessions?”). Each item has a 155 mm horizontal line with two response options, one at the beginning and one at the end. The distance between the beginning of the line and the point marked by the respondent consists of the item's score. The CES was adapted for the Brazilian population by Teixeira et al. (2011) and presented good psychometric qualities. Cronbach's alpha from the CES in the present sample was .83.

In addition to the aforementioned instruments, a self-report sociodemographic questionnaire was applied to describe the sample. Questions included data such as name, age, colour/race, body mass and height (for BMI calculation), physical exercise (yes or no), practice frequency (from one to more than five times per week), use of dietary supplements and anabolic steroids.

Data analysis

Descriptive statistics were performed by mean and standard deviation. Categorical data were described in absolute and relative frequency. Data were evaluated for their normality by means of the Komolgorov-Smirnov test and inspection of asymmetry and kurtosis. No violation of the null hypothesis was identified. Comparison between groups was performed through Analysis of Variance (ANOVA one-way) followed by Tukey post hoc. For this, the following groups were formed: (a) sedentary - do not exercise, (b) active - practice from one to four times a week and (c) very active - more than five times a week. Homogeneity test of Levene was conducted previously the analyses. Practical differences between the groups were analysed by calculating the effect size (η^2). Therefore, .30 effect sizes were considered small, .50 moderate and above .80 high (Cohen, 1992).

Estimated internal consistency of all measures were performed by calculating Cronbach’s alpha coefficient (α). Values greater than .70 are considered adequate (Nunnally & Bernstein, 1978). All data analysis

was performed using the Statistical Package for the Social Sciences version 21.0 (SPSS Inc., Chicago, United States), adopting a 5% significance level ($p < .05$).

Results

A total of 265 undergraduate men aged between 18 and 35 years ($M = 22.38$, $SD = 3.72$) took part voluntarily in the study. Body mass index varied between 17.41 to 44.55 kg/m² ($M = 24.09$, $SD = 3.90$). The large majority declared themselves brown ($n = 118$; 44.5%), followed by white ($n = 102$; 38.5%), black ($n = 39$; 14.7%), and other ethnic origins ($n = 6$; 2.3%). Of the total, 30 (11.32%) use food supplements and 4 (1.5 %) anabolic steroids. The descriptive data and comparison between groups is shown in Table 1.

Table 1. Comparison of muscle dysmorphia symptoms, body dissatisfaction, drive for muscularity, body-ideal internalization and commitment to exercise between groups.

Variables	Sedentary <i>M(SD)</i>	Active <i>M(SD)</i>	Very active <i>M(SD)</i>	ANOVA one-way	η^2
MDDI	24.0 (6.7)	26.3 (7.9)	25.8 (7.1)	$F_{(2, 262)} = 2.78$; $p = .063$	0.021
MBDS	5.7 (1.1) ^a	5.6 (1.1)	5.2 (1.0) ^a	$F_{(2, 262)} = 3.20$; $p = .042^*$	0.024
DMS	27.3 (10.0) ^a	30.8 (10.9)	33.5 (12.1) ^a	$F_{(2, 262)} = 7.39$; $p = .001^{\#}$	0.053
SATAQ-3	25.8 (10.7)	26.2 (9.4)	28.1 (10.3)	$F_{(2, 262)} = 1.14$; $p = .310$	0.009
CES	259.9 (199.6) ^a	440.9 (214.2) ^b	536.3 (216.6) ^{a,b}	$F_{(2, 262)} = 41.36$; $p = .001^{\#}$	0.240

Note: M = mean; SD = Standard deviation; η^2 = eta square (effect size); MDDI = Muscle Dysmorphia Disorder Inventory; MBDS = Male Body Dissatisfaction Scale; DMS = Drive for Muscularity Scale; SATAQ-3 = Sociocultural Attitudes Towards Appearance Questionnaire-3; CES = Commitment to Exercise Scale. ^a significant difference between sedentary and very active groups. ^b significant difference between active and very active groups. * significant to $p < .05$. [#] significant to $p < .001$.

Statistically significant differences between groups were identified. Very active subjects showed higher drive for muscularity than sedentary did. However, sedentary subjects manifested higher body dissatisfaction than very active. Scores on commitment to exercise were higher in very active when compared to both sedentary and active groups. No differences were observed between groups for muscle dysmorphia symptoms and body-ideal internalization.

Discussion

Some studies have evaluated the muscle dysmorphia symptoms, eating disorders and body image disturbances in athletes of several sports, in which should be mentioned the emphasis on evaluating bodybuilders (Mitchell et al., 2017; Piacentino et al., 2015; Ströhle, 2018). However, few studies have focused on sedentary and physically activity non-athletes. Therefore, this study aimed to compare muscle dysmorphia symptoms, body image disturbances (body dissatisfaction, the drive for muscularity and body-ideal internalization) and commitment to exercise between sedentary and physically active subjects. The main results of our study showed differences between sedentary, active and very active subjects, for variables such as body dissatisfaction, the drive for muscularity and commitment to exercise. Specifically, sedentary subjects have greater body dissatisfaction than very active group. This result refutes our hypothesis that very active subjects will present greater body dissatisfaction. One possible explanation is that adequate levels of exercise are able to reduce body dissatisfaction (Bassett-Gunter et al., 2017). Bassett-Gunter et al. (2017) indicate three explanatory mechanisms: (a) objective changes in physical fitness, (b) perceived changes in physical fitness, and (c) changes in self-efficacy. Probably very active subjects of the present research showed lower scores on body dissatisfaction due to exercise benefits to body image disturbances.

However, the drive for muscularity were significantly higher in very active group than sedentary. The drive for muscularity is a complex and multifaceted construct that includes attitudinal (muscularity-oriented body image) and behavioural aspects (muscularity-oriented behaviours) (McCreary & Sasse, 2000). As indicated by Edwards et al. (2016), those engaged in a routine of training may be more influenced by social pressures to achieve the mesomorphic male body-ideal. Therefore, attitudes and behaviours towards muscularity would be more common in active than sedentary subjects. Low levels of the drive for muscularity may be beneficial since they guide individuals to practice some physical exercise, such as resistance training (Tod & Edwards, 2015). The presence of higher scores on the drive for muscularity and lower degree of body dissatisfaction observed in very active group is consistent with theories on the study field. An adequate degree of the drive for muscularity leads the subjects to practice exercises focused on increasing muscle volume and size, which consequently reduces body dissatisfaction, since the socially acceptable body ideal for men is mesomorphic. Nevertheless, attention should be paid to the degree of drive for muscularity since higher levels are related to compulsive exercise, drug abuse, social impairment, and unhealthy diets (Tod & Edwards, 2015).

Regarding the drive for muscularity and commitment to exercise, a recent study with young Brazilian adults (Carvalho et al., 2016) demonstrated a direct and significant association between these variables. Our

results indicate that commitment to exercise differ between sedentary, active and very active groups. The higher the frequency of physical activity, the greater the commitment to exercise. It is worth noting that harmful attitudes and behaviors of commitment to exercise evaluated include “continue to exercise at times when you feel tired or unwell”, “feel ‘guilty’ because of missing exercise session” and “turn down an invitation to an interesting social event because it interferes on exercise schedule”. Thus, although very active group present lower body dissatisfaction, these individuals evidenced a greater degree of psychological commitment to exercise, which may be detrimental somehow to these subjects. Although regular practice of exercises is generally recognized as beneficial to the subjects (Bassett-Gunter et al., 2017), some aspects such as high levels of the drive for muscularity and commitment to exercise should be evaluated and observed by coaches and physical trainers.

The athletic ideal-body conveyed by social media and others sociocultural factors may be one of the factors related to the pursuit of a muscular and defined body (Tylka, 2011). Specifically about the body-ideal internalization, our results indicate no significant difference regardless of the level of physical activity. In other words, body-ideal internalization seems to affect sedentary, active and very active subjects in a similar way. Social media is recognized as one of the most impactful factors on body image disturbances and seems to reach a large audience (Holland & Tiggemann, 2016). Due to its importance in the present western society, the media seems to reach the subjects in a universal way, which contributes to the internalization of body ideals.

Finally, no differences were observed between groups for the symptoms of muscle dysmorphia. Patients with muscle dysmorphia demonstrate an extremely rigid training. They usually present impairment in their occupational and social functioning, adopt unhealth and risk behaviors as rigid diets and excessive exercise even when contraindicated, and are prone to use anabolic steroids (Pope Jr et al., 1997). These characteristics demonstrate the severity of muscle dysmorphia and may explain the reasons that no differences were observed between evaluated groups. The mean scores obtained by groups on the MMDI (measure of symptoms of muscle dysmorphia) ranged from 24.0 to 26.3, which is low against the possible variation of the instrument that range from 0 to 78 points. Although body dissatisfaction, commitment to exercise and the drive for muscularity are related to the symptoms of muscle dysmorphia, they are not the only variables that explain this psychopathology, which has a multifactorial presentation (Compte, Sepúlveda, & Torrente, 2018). Probably only subjects with high scores of body image disturbances, the drive for muscularity and commitment to exercise will show signs and symptoms of muscle dysmorphia.

The present study is innovative and brings important information to the field of muscle dysmorphia, body image disturbances and commitment to exercise in non-athletes, sedentary and physically active males. However, this research is not without limitations. First, our study used self-report instruments that may not be the best approach for evaluating some issues that present a high bias of social desirability by the respondents. However, it should be noted that all the instruments present adequate psychometric properties for this population, including estimated internal consistency calculated to the present sample for all measures. Secondly, our study is cross-sectional. It is not possible to analyse causality. For example, we cannot endorse if the lower level of body dissatisfaction observed in very active group results from exercise practice or a specific characteristic of the sample evaluated. Thus, we recommended longitudinal studies to investigate this issue. Third, the assessment of the physical activity level was performed through the weekly training frequency, which may not be best approach. Finally, only undergraduate men were evaluated, it would be important to evaluate other populations that are at risk for development of body image disturbances and muscle dysmorphia as adolescents and non-university samples of both sexes.

Conclusions

We conclude that body dissatisfaction, the drive for muscularity and commitment to exercise differ between sedentary, active and very active subjects. Frequency of exercise practice seems to be associated with body image disturbances and exercise dependence. Although the groups did not differ in relation of body-ideal internalization and muscle dysmorphia, researches should pay attention to such variables since they are directly related to the health and quality of life of the population.

Conflicts of interest – Authors declare no conflicts of interests.

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