

MUSCLE DYSMORPHIA AMONG COMPETITIVE BODYBUILDERS

Jorge Humberto Guerra-Torres^{1*} Elkin Fernando Arango-Vélez²

¹MSc. in Motricity, GRICAFDE Group, University of Antioquia, Calle 70 No. 52-21, Medellín, Colombia.

²MSc. in Clinical Epidemiology, Physical Activity and Sports Applied Sciences Research Group GRICAFDE, Physical Education Institute, University of Antioquia, Calle 70 No. 52-21, Medellín, Colombia.

*E-mail: campeon62@gmail.com

ABSTRACT

Introduction: The body image distortions have increased in the world, and among those the muscle dysmorphia has an important place. **Objective:** To determine the frequency of the muscle dysmorphia among a body builders group. **Methodology:** a descriptive, exploratory transversal study with a convenience sample. Information gathered with the “muscle dysmorphia inventory” questionnaire, which allowed detecting the distortion presence; and through a predesigned questionnaire the socio-demographic and anthropometric variables were investigated. An univariate analysis was done (proportions, means and standard deviation) and a bivariate to compare proportions using the Chi², with a significance of $p < 0,05$. **Results :** 50 competitive body builders from the Aburrá Valley were included, with an average age of 29,7 years (SD \pm 8,5) and a body mass index average of 27,8 (SD \pm 3,7). The muscle dysmorphia frequency was of 52%, with high proportions of body image concerns (50%), restricted diet (40%), use of supplements and exercise dependence (34%) and use or abuse of pharmacological substances (58%); and low physical appearance hiding behavior frequency (8%). **Conclusions:** High muscle dysmorphia prevalence was found among the body builders group, without significant statistical differences observed on muscle dysmorphia neither by BMI, age, educational level, socio-economical level nor by physical appearance hiding behaviors and use or abuse of pharmacological substances.

Keywords: Muscle dysmorphia, body image, body building.

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DISMORFIA MUSCULAR EN UN GRUPO DE HOMBRES PRACTICANTES DE FISICULTURISMO COMPETITIVO

RESUMEN

Introducción: Los trastornos de la imagen corporal se han incrementado en el mundo, y dentro de estos la Dismorfia Muscular (DM) ocupa un lugar importante. En Colombia no se conoce la magnitud de este problema. **Objetivo:** Determinar la frecuencia de la DM en un grupo de hombres fisiculturistas. **Metodología:** Estudio transversal descriptivo, exploratorio. Muestra a conveniencia. La información se recolectó por medio del cuestionario “Inventario de Dismorfia Muscular”, el cual permitió detectar la presencia del trastorno; se indagó por variables socio-demográficas y antropométricas por medio de una encuesta prediseñada. Se hizo un análisis univariado (proporciones, medias y desviación estándar) y uno bivariado al comparar proporciones mediante la prueba de Chi², con un nivel de significancia $p < 0,05$. **Resultados:** Se incluyeron 50 fisiculturistas competitivos del Valle de Aburrá con un promedio de edad de 29,7 años (DE 8,5) y un índice de masa corporal (IMC) promedio de 27,8 (DE 3,7). La frecuencia de Dismorfia Muscular fue del 52%, con altas proporciones de preocupación por la imagen corporal (50%), dieta restringida (40%), uso de suplementos alimentarios y dependencia al ejercicio (34%) y uso y/o abuso de sustancias farmacológicas (58%); y baja frecuencia de comportamientos para ocultar la apariencia física (8%). **Conclusiones:** Se encontró una alta prevalencia de DM en el grupo de fisiculturistas, sin diferencias estadísticamente significativas en dicha prevalencia al discriminar por IMC, edad, estrato socio-económico o nivel educativo, ocultamiento de la apariencia física y abuso de sustancias farmacológicas.

Palabras claves: dismorfia muscular, imagen corporal, fisiculturismo.

1. INTRODUCTION

Nowadays modern societies enclosed in the context of the present technological development, have a tendency of searching for the physical perfection and a "whole body round health", which generates a series of physical and body image distortions. Each one of those distortions gathers characteristics that seem to unify them, although the peculiar specific expression belongs to each person. First of all, those distortions have a subjective appeal, as they just obey to purely personal decisions, which prove the social pressure motivation. Secondly, the psychological fact, that underlies in such decisions, constrain that every psychological or emotional distortion should be approached on an individual basis. Because of the diverse origin of this distortions, conception of the social pressure and psychological personal characteristics, obstruct the suitable diagnosis and procedures elaboration for its treatment [1].

One of these cases is the distortion identified by Pope in 1993, which was initially named as Vigorexia. Pope himself gave it other names as Adonis complex and Reverse anorexia, but today it is known as Muscle Dysmorphia (MD) among those authors that place the distortion within the body dimorphic disorder (BDD) [1-4]. A debate opens up from Pope's "The Adonis Complex" publication in 1993, as the clinical autonomy of the syndrome is not yet recognized; it tends to determine the clinical principal basic psychological processes which support the Adonis complex. Within this theoretical debate, some authors seem to agree in the autonomic existence of the syndrome, as the male dominance development of it.

It seems that males have faced pressure to construct a model of a body according to the modern times characterized by a muscular fat free physique, which could generate high levels of body image dissatisfaction, eating disorders, and substances and exercise abuses, with the only purpose to answer to the proposed body image era idea [5]. Doing physical activity to improve the aesthetic appearance instead off the health condition, shows as a result a habit more and more popular among the males, this could motivate the arrival of new syndromes as the MD, distortion characterized by an obsessive idea about the physical appearance and a series of compulsive actions to achieve a body image according to the proposed present body ideal which looks for the

development of the body muscles mass to a maximum, getting as a result a negative effect not only for the social life but also for psychological mainly produced by unbalance on the physical level [5]. Arbinaga et al (2008), assure that the MD is more frequent among males who take part on competitive body building [2].

In these sense, the obsessive physical appearance concern, the overvalue of it, the body image distortion, the permanent presence of obsessive thoughts about the body, the anxiety and appearance of depression symptoms, social and labor altered behaviors, among others, seems to be the phenomenological display which allow to establish the distortion presence. The MD, also defined as, chronic concern for a lack of a sufficient body muscular mass or symmetry of a person, results in serious social and occupational performance obstacles, also a marked distress which will at the end develop in a chronic use of sports performance enhance stimulating substances [6].

At present in Colombia and specifically in Antioquia it is unknown how this phenomenon works, that is why the objective of this investigation was to determine the MD prevalence among a group of male competitive bodybuilders aged over 18 years, citizens of the metropolitan Aburrá Valley area, during 2012.

2. MATERIALS AND METHODS

A descriptive transversal study was done. A convenience sample was gathered from a group of male competitive bodybuilders, because the total number of subjects that may form the sample is unknown; an effort was done to include the highest number of them into the research. 50 body builders of a 29,7 years old on average (SD $\pm 8,5$) and with an average body mass index of $27,8 \text{ kg/m}^2$ (SD $\pm 3,7$) were included.

Selection criteria: Males over 18 years old, inhabitants of the metropolitan "Aburrá Valley" area with at least a year of bodybuilding practice experience and who had had a minimum one official competitive experience participation and who agreed to sign the informed consent form were included. People with motor or sensitive distortions and who had not practiced their sport activity for the last three months were excluded.

Information gathering and variables definition

The “Muscle Dysmorphia Inventory” (MDI) questionnaire was used to gather the information [7], that Spanish translated instrument, was standardized and adapted to the investigation study sample. The questionnaires were answered at their training places (gyms) and/or their residence houses, during the period between April and July 2012. From a Cronbach statistical analysis the test reliability was established, which produced a result of a 0,919 value [8].

The questionnaire is based on Lantz and Rhea’s associated factors to the MD conceptual model [7], which is divided in 6 subcategories, as follows: 1) size and body symmetry, refers to muscular definition, where legs proportion are compared with the arms, the trunk, the arms are compared with the back, the biceps are compared with the triceps, etc.. 2) Body dissatisfaction states behaviors developed to hide perceived physical abnormalities through camouflage methods such as over size clothing wearing, makeup, or hands used to hide the perceived abnormality. 3) Exercise dependence behaviors, featuring rigid and intense compulsive exercise practice, with high guiltiness feelings when losing or violating a training session. 4) Supplements usage, refers to the supplements consumption to achieve the physical desired levels. 5) Dietary behavior, a diet solely aimed to increase the size, the strength, and muscle definition. This process implies careful monitoring of quantities and type of calories consumption to ensure the maximum muscle mass development whilst body fat is eliminated. 6) Use of steroids and other illegal or banned pharmacological aids, refers to diuretics usage to dehydrate the muscles to look thinner or chubbier, as to the steroids usage to look bigger and more attractive, also laxatives and slimming medicines.

The instrument use a liker type scale with answers that vary from one to six (never = 1, rare = 2, sometimes = 3, frequently = 4, usually = 5, and always = 6); six is the nearest score to the syndrome direction and one is the furthestmost score from it. Each item’s score just contribute to one of the subcategories, and those scores are calculated adding up the scores belonging to one particular subgroup, each subgroup scores are multiplied by a constant (in this particular case 5) with the only aim to obtain the cutoff point, and the ones above of that cutoff point value will be considered to fulfill with the MD criteria and the ones below it are free of it.

To evaluate the socio-demographic, anthropometric and exercise behavior aspects a predesigned questionnaire was used which asked for, age, socio-economic strata (from 1 to 6, where the lowest value correspond to lowermost economical income, and 6 to a highest attained income), educational background (low = without education, nursery and primary school; middle = secondary and technical education; high = technological, university and post graduate level); occupation (unemployed, employed, self-employed / or employer, student), body weight, high, exercise frequency (one or twice per week, three to five times per week, every day) and slimming substances usage. The body mass index (BMI) was obtained from the subject’s self-reported body weight and high. The validity of the BMI score from a self-report has been evaluated in other studies which had described correlation coefficients of 0,991 for the body weight and 0,944 for the BMI (9-12).

Bias control. To minimize the information bias, before the study began, a pilot test using a sample of the study subjects was done in order to standardize the procedures to be carried out. Also, to abolish the questionnaires information contradictions, the quality of processed questionnaires was checked for missing information. The study aims and procedures were explained to the subjects; as the confidentiality of the given data was assured to them. The selection bias was done based in the selection criteria.

The information source is of primary type, obtained through two predesigned questionnaires applied in a standardized way by a single person.

Statistical analysis. The data were processed using the statistical package SPSS version 20 for Windows and the Excel 2010. The quantitative variables were summarized through proportions distribution; the qualitative variables with normal distribution were summarized through averages and standard deviations (SD), and the ones with no normal distribution through means and interquartile ranges. To evaluate whether or not the variable came from a normal distribution population the Kolmogorov-Smirnov test was used. To compare the qualitative variables proportions a Chi² was used. All the analysis were done taking into account an Alfa ≤ 0,05 with a significance of 95%. As a convenience sample with the highest possible

number of subjects was used, and because of the study transversal design, not loses were reported.

Ethical considerations. People’s intimacy protection was guaranteed according to the 2008 Helsinki declaration [13] and the 08430 resolution from 1993 of the Colombian Republic Health Ministry (articles one and fifteen) [14] about informed consent and alive human beings studies. The participants received detailed information about objectives and procedures of the investigation and the exclusive use of the data for scientific purposes.

3. RESULTS

50 males with an average age of 29,7 (SD ± 8,5) were included, a 27,5 median age (range 18 – 59), from which 30% were found within the group between 24-29 years of age; 62% of those males were single and belonged to the middle social strata, 52% had a high educational background, and 90% were either employees or self-employed workers. The average BMI was 27,8 (3, 7 ± SD) and 100% of the participants recognized to do exercise at least 3 times per week (see table 1).

About dietary supplements and pharmacological aids consumption, 66% of them accepted they had consumed supplements, 58% recognized they had used anabolics and 64% confessed the use of diuretics (see table 2).

The MD had a prevalence of 52%; and of the total of subjects with the syndrome, 12 (24%) complied with at least two of the previously described subcategories, 10 (20%) met the terms for 5 of them, and 4 (8%) fulfilled all of them. When referred to the occupation the prevalence showed that the MD was present in 56,3% of the self-employed subjects and in the total number of students. Among those who had a high educational level, the syndrome was present in 53,8% of them. When the analysis was done by social-strata, it was found that the syndrome was present in 80% of the subjects belong to the high social-strata whilst it was present just in the 50% of the subjects that fitted in to the low social-strata. About the BMI, the syndrome affected the 64,7% of who had had a >29,1 kg/m² score and amid those in the lower tertile (IMC 22,7-25,7 kg/m²) the syndrome was found in one of every two people (see table 3).

When the analysis was done by the subcategories number, the results showed that the men between 35–59 years of age, 33,3% met the terms for two of those, 27,3% of the group between 30–34 years of age fulfilled with 5 and 13,3% among the subjects in the 24-29 years of age group complied with all the subcategories. Those who had fulfilled all the subcategories when referred to the education level where located within the group of subjects with a high educational level (12,5%). In the high social-economic strata were found the highest percentage (60%) of those who complied with 5 of the subgroups conditions (see table 4). The proportion of the sample subjects that fulfilled the cutoff point for the MD syndrome is shown in table 5.

3.1 Figures y Tables

Table 1. Study sample socio-demographic and exercise frequency features.

	n = 50	%
Marital status		
Single	31	62,0
Marriage	7	14,0
divorce / separate	4	8,0
Common law marriage	8	16,0
Social strata		
Low	14	28,0
Middle	31	62,0
High	5	10,0
Educational level		
Middle	24	48,0
High	26	52,0
Occupation		
Unemployed	1	2,0
Employed	29	58,0
Self-employed / employer	16	32,0
student	4	8,0
Exercise frequency*		
Between three and five times per week	34	68,0
>5 days per week	16	32,0

*Includes general exercise and weight lifting

Table 2. Feeding dietary supplements and drugs* consumption and eating disorders**.

	n = 50	%
slimming medicines consumption	23	46,0
Anabolic consumption	29	58,0
Diuretics consumption	32	64,0
Eating disorders	6	12,0
Laxatives usage	9	18,0
Supplements usage	33	66,0

*Drugs: anabolic steroids, diuretics, slimming medicines, laxatives.

**Eating disorders: none other specified thing.

Table 3. MD Prevalence by BMI and socio-demographic features.

	N=50			p
	MD n	%	Total n	
age				0,489
18-23	7	58,3	12	
24-29	7	46,7	15	
30-34	5	45,5	11	
35-59	7	58,3	12	
occupation				0,035
Unemployed	0	0	1	
employed	13	44,8	29	
Self-employed	9	56,3	16	
student	4	100	4	
education				0,788
low	0	0	0	
middle	12	50	24	
high	14	53,8	26	
BMI				0,392
22,7-25,7	8	50	16	
25,8-29,1	7	41,2	17	
>29,1	11	64,7	17	
Social strata				0,425
low	7	50	14	
middle	15	48,4	31	
high	4	80	5	
marital status				0,193
single	17	65,4	31	
marriage	5	19,2	7	
divorce / separate	2	7,7	4	
Common law marriage	2	7,7	8	

Table 4. Number of MD subcategories by age, occupation, BMI and social strata.

	MD		2 subcategories		5 subcategories		6 subcategories	
	n=50	%	n=50	%	n=50	%	n=50	%
age								
18-23	7	58,3	3	25,0	3	25,0	1	8,3
24-29	7	46,7	3	20,0	2	13,3	2	13,3
30-34	5	45,5	2	18,2	3	27,3	0	,0
35-59	7	58,3	4	33,3	2	16,7	1	8,3
Occupation								
unemployed	0	0	0	0	0	0	0	0
employed	13	44,8	8	27,6	2	6,9	3	10,3
Self-employed	9	56,3	2	12,5	6	37,5	1	6,3
student	4	100,0	2	50,0	2	50,0	0	,0
Education								
middle	12	50,0	5	20,8	4	16,7	3	12,5
high	14	53,8	7	26,9	6	23,1	1	3,8
BMI								
22,7-25,7	8	50,0	3	18,8	2	12,5	3	18,8
25,8-29,1	7	41,2	4	23,5	2	11,8	1	5,9
>29,1	11	64,7	5	29,4	6	35,3	0	,0
Social strata								
low	7	50,0	4	28,6	2	14,3	1	7,1
middle	15	48,4	7	22,6	5	16,1	3	9,7
high	4	80,0	1	20,0	3	60,0	0	,0

Table 5. Subjects proportion that achieved the MD* cut off point.

subcategory	Items	Cut off point	n = 50	%
Diet	5	≥25	20	40,0
Supplement	4	≥20	17	34,0
Physique protection	6	≥30	4	8,0
Exercise dependence	4	≥20	17	34,0
size / Symmetry	5	≥25	25	50,0
pharmacology	3	≥15	1	2,0

*calculated scores with the "Muscle Dysmorphia Inventory"

4. DISCUSIÓN

To the researcher knowledge, this is the first study of its kind that asked about MD within competitive bodybuilder's population in Colombia.

Researches in different contexts had discovered that men who carry out gym physical activities had more related body image affections than those who

do not do it [5, 15]. Similarly, those researches point out to demonstrate that men and women contrast in terms of their preferences about their body image and physical ideals. Whilst it seems that women idealize a slimmed toned figure, a great proportion of men fancy a muscular and fat free physique [16, 17]. A study with 30 males done in Spain showed that 40% of them had the MD symptoms [18]; equally in Mexico it was observed in gym male users that 22% of the study sample also had the MD symptoms [19]. In the USA when 63 males were studied an incidence of 22,2% of MD was found (20), whereas in Chile among 172 males a MD frequency established was of 13,6% (21), and in Australia an MD proportion of 17% among a population of 646 subjects was found [22]. All this results revealed a lower MD prevalence compared to that found in this study, which was of a 52%. A first possible hypothesis to that inconsistency refers to the fact that this study was done with competitive bodybuilders, whilst the comparison studies were done with miscellaneous population (bodybuilders, weight lifters or others) or sport men come from other kind of sport disciplines. Also it could be said that the syndrome obey to a socio-cultural factors, which might affect people's body image perception.

The role that the socio-cultural factors may exert and the existence of a significant social pressure to attain a specific ideal, strong and muscular physical appearance, among the males, unconsciously push them to look for an imitating model. Likewise, the modern bodybuilding boom may contribute to the gym's subculture development where the subjects display their distress because of an extreme ideal of physical appearance, unmindful of their surroundings. According to Kouri et al., the observed MD proportions in male bodybuilders vary between 28 and 60% [23]. In the same direction, Arbinaga et al., argue that the MD is of a higher frequency among those male who are competitive bodybuilders [2].

In the other hand, the socio-demographic study features, showed that the MD is of a higher prevalence among single people as 65,4% of the studied subjects positively identified as dysmorphic were single people, this outcome is similar to the conclusions of Arbinaga et al (2008)., who found that 71,8% of the competitive bodybuilders were single. Also, for this sample the highest MD percentages were among the occupational active subjects, with a high or middle educational background and belonging to the middle or high

socio-economical strata, all this data is similar to Arbinaga et al (2008)., report where 73,2% were among the working active subjects and 47,1% had a middle educational background [2]. A possible explanation to these results is the fact that the competitive bodybuilders need high amounts of money to cover for their diet, supplements, sport equipment, gym entrance fees, pharmacological products usage, and off course the competition entrance fee and expenses costs. For this reason it is obvious that they should be job-related active subjects preferable self-employed, which will allow them the flexibility of time to do their required and desired activity practice, and to have a good educational background to deepen into the readings common to that subculture.

Moore's study with 872 males, found that 33% of them were unsatisfied with their general physical appearance [24]. Those findings are consistent with this study discovery, as it was observed that the subgroup "size and symmetry" showed a prevalence of 50%, what shows up a concern about their body image among one in two of the evaluated subjects. The extent that body dissatisfaction achieves is a general component that relates to the self-esteem and it is also associated to the importance people give to physical appearance [25]. In fact, self-esteem in some cases according to Lombardo – could be associated to factors such as body size, shape and general features of a person or a prototype [26]. The body image related concerns have two components: the first is the perception (distortion) and the second an attitude (dissatisfaction). The body image distortion is a disturbance of the interior image perception that someone have about their own body, whilst the dissatisfaction is a disturbance sense that each one have about their own body [7]. It is reported in the literature, that one of the factors people with MD is possibly more concerns about is the body size and symmetry [7], visible fact in this study results. In the other hand, Mishkind et al.; suggest that powerful social and cultural forces guide men towards a masculinity direction, as women are guided towards a femininity ideal [27]; even Veale et al.; suggest that body image prefixed attitudes demand a high effort of perfectionism or symmetry of a person's appearance [28]. When all these different perceptions are considered as a whole, the ideal body image turns up as an imaginary body support and suffers distortions or may be affected by the different cultural ideals of each of the genders, which demands from women to be slim and from

men to be muscular and fat free [27]. It is worth mentioning that those cultural ideals and social pressures do not act in the same way on every single member of the society, what means that not every man wants to be muscular neither every woman wants to be slim [29].

Previous studies about bodybuilders' behaviour reveal a trend that shows a distinguished feeding, body image and exercise concern. It was observed in those studies that the feeding habits were ruled by the exercise routines but not by the hunger feelings [30]. Similarly the admittance of anabolic steroid use during the body weight gaining training sessions phase, a high caloric daily intake, all of this, to a high economic value and time consuming; also the vast majority of bodybuilders acknowledge their preference to cook for themselves, avoiding in that way, social meetings and restaurants to ensure the low fat diets intake and to have a rich protein meals, supplemented by protein powder, slimming tablets, diuretics and other nutritional products [30].

Other studies done by Vives Benedicto et al., and Behar et al., showed that 80,6% and 83,3% of the people, respectively from those studies, believed that eating was important not only for the development of their sport activities but also to improve their optimum muscle power development, being very important to analyze the caloric content of whatever they consumed [21, 31]. Those findings support the outcomes of this study, as a high percentage of the sample (one in two, in the age group of 35-59) and 66% of the total subjects with the syndrome, accepted that the diet and the supplements intake were important to them, what agrees with an Spanish study done with 141 subjects, where a high nutritional supplements consumption among males with MD was reported [32]. A tendency can be perceived to restrain the intake of carbohydrates and an increased intake of proteins; this type of diets could have negative health consequences in the short and long term. The excessive protein consumption is just prescribed to people with specific pathologies which demand an increased intake of it. A protein excess in a person may cause renal and endocrine damages [13, 33].

68% of the study sample admitted a bodybuilding practice frequency of 3-5 times per week. It is very common that people with MD have long gym sessions, some studies relate these muscle dysmorphic behaviors with the not chemical

addictions such as gambling, power, money, sex or sports. The physical activities practice yields endogenous opioids such as endorphins, which produce a natural enjoyment feeling. Those physiological hormones that produce numbness and a happy and relaxed feeling are release into the blood stream with the aim to neutralize the pain or the extreme tiredness feeling produced by the long exercise sessions in a sport person. All this can be compared with the abstinence feelings, without adding up the negative feelings those addicts to the sport activities have when they are unable to do it. May be it is one of the explanations that take us to think that it is an exercise addiction, as the more physical activity is done, the higher the amount of endorphins released into the blood stream, therefore, the higher the pleasure or relaxing feeling [33, 34]. This may be an explanation to understand some of the MD characteristics, although it does not explain the syndrome itself, as it is not possible by certain to know if the exercise excess is done to achieve the pleasure obtained from the endorphins released or in pursuit of an ideal body image.

A low proportion of the body dissatisfaction subgroup, category aimed to evaluate behaviors developed to hide perceived physical abnormalities was found in this study; only 8% fulfilled the cutoff point for that subgroup, although they had expressed high image dissatisfaction. This data contrast not only with [6] findings but also with the guidelines set by [20] and [31], because this research participants were competitive bodybuilders, who constantly exhibit themselves to others glance and careful scrutiny, not only when they compete but also in their normal routines. That behavior suggests that these subjects do not act in accordance with the proposed hypothesis by Pope et al., and Lantz et al., which states that there is an effort to avoid public body display or to experience those situations with an intense distress. By the contrary, this fact seems to be consistent with the found conclusions in the "Adonis or hephaestus?"

Exploring body image in male athletes study, where the complex nature of the competitive sports could take the athletes to feel a combination of high self-esteem associated to a certain degree of body dissatisfaction [24, 35]. For that reason, it is necessary a deep qualitative research about that characteristic to better understand the bodybuilders body image experiences, including their perceptions about the factors that influence the body image and the way those impact their behavior.

64,7% of the identified study subjects as dysmorphic had an BMI $>29,1 \text{ kg/m}^2$ and 58% of them admitted anabolic steroids usage. According to Leone et al., a lot of people turn to anabolic steroids or dangerous substances to satisfy their willness when they are unable to reach their personal aims or cannot manage pressures related to unrealistic body ideals coming from their coaches [36], hence possibly the high proportion of subjects affected by the MD in this research (66%) that admitted the supplements usage. Leone et al., point out to the fact that the amount of people at risk to develop MD is generally exponentially increasing because of the weight lifting and bodybuilding subculture boom, which may lead them to learn that the anabolic steroids usage can produced results that none other supplement can achieve [37]. Also, it is said that although people's extreme efforts, a lot of the dysmorphic subjects fight to achieve a genetically improbable physical appearance through diet and exercise alone, that is why the anabolic steroids, supplements and pharmacological interventions usage turn into an exaggerated muscle mass size development [38,39], a real statistic in this study which showed a big guys with high BMI (64,7% had a BMI $>29,1 \text{ kg/m}^2$), high percentage of anabolic steroids usage (58%) and an increased dietary supplements usage (66%), scores that may easily be higher due to a possible information bias as there are some bodybuilders that do not acknowledge the use of substances to improve their muscle mass.

This research had as one of the limiting factors the lack of a validated instrument for our population to determine the MD presence, which may bias the true prevalence of the syndrome among the studied sample. Other limiting factors were: the possible subjects information bias, as they did not allow the anthropometric variables (body weight, height, fat percentage) to be directly measured or if they provided fake variables data like substances intake; also the comparison studies done in different parts of the world used different MD measuring instruments to evaluate it, which makes it difficult to compare the results of this study with them; also, the low number of participants, limiting the statistical power of this research; A convenience chosen sample and possibly the number of participants may not be entirely representative of those that conform the total competitive bodybuilders group of the "Metropolitan Aburrá Valley Area ", reason why the

legitimacy of this study sticks to the studied population.

Finally, it is relevant to suggest the development of new researches about the MD prevalence on a diverse population, not only regionally but also nationally, to better characterize the problem and to propose strategies which may allow to reduce its consequences not only at individual level but collectively. The health professionals should be able to recognize the MD diagnostic criteria, to choose the appropriate intervention, and to maintain a close contact with the affected person through a specific follow up period of time. To help people to resist the lure of certain ideals of the time is a fundamental step (16). To promote awareness among coaches, sport people and health professionals would help to address this rising and concerning problem.

5. CONCLUSION

As a conclusion, a high MD frequency exist among the Metropolitan Aburrá Valley Area bodybuilders sample subjects, supported in the high percentage of subjects concerned with their body image, on a restricted diet, the use of dietary supplements and the exercise dependence. Low proportions of hiding physical appearance behaviors were found. In the other hand, a high prevalence of use or abuse of pharmacological substances among the study sample was recognized by them. Not important differences were found in the prevalence by BMI, age, educational level, or by social strata.

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7. REFERENCES

- [1] Baile, A.J. ¿Qué es la imagen corporal? Cuadernos del Marquez de San Adrian., 2, 53 - 70. 2003.
- [2] Arbinaga, F., y Caracuel, J. Imagen corporal en varones fisicoculturistas. Acta colombiana de psicología., 11(1), 75-88, 2008.
- [3] Leone, J.S.E., Gray, K. Recognition and treatment of muscle dysmorphia and related body image disorders. Journal of Athletic Training., 40(4), 352-9, 2005.
- [4] Olivardia, R., Pope, H., Borowiecki III, J., y Cohane, G. Biceps and body image: the relationship between muscularity and self-esteem, depression, and eating disorder symptoms. . Psychology of men & masculinity., 5(2), 112-20, 2004.
- [5] Baile J, M.K., y Garay, F. Alteración de la imagen corporal en un grupo de usuarios de gimnasio. Enseñanza e investigación en psicología., 10(1), 161 – 9, 2005.
- [6] Olivardia, R., Pope, H., y Hudson, J. Muscle dysmorphia in male weightlifters: a case-control study. The american journal of psychiatry., 157, 1291-6, 2000.
- [7] Lantz, C., Rhea, D., y Cornelius, A. Muscle dysmorphia in elite-level power lifters and bodybuilders: a test of differences within a conceptual model. Journal of strength and conditioning research., 16(4), 649-55, 2002.
- [8] Cortina, J. What is coefficient alpha? An examination of theory and applications. Journal of Applied Psychology., 78(1), 98-104, 1993.
- [9] Bes-Rastrollo, M., Pérez – Valdivieso, J., Sánchez-Villegas, A., Alonso, A., y Martínez-González, M. Validación del peso e índice de masa corporal auto-declarados de los participantes de una cohorte de graduados Universitarios. Revista Española de Obesidad., 3(6), 352-8, 2005.
- [10] Chor, D., Coutinho, EdSF., y Laurenti, R. Reliability of self-reported weight and height among State bank employees. Revista de Saúde Pública., 33, 16-23, 1999.
- [11] Schmidt, M., Duncan, B., Tavares, M., Polanczyk, C., Pellanda, L., y Zimmer, P. Validity of self-reported weight: a study of urban brazilian adults. Revista de Saúde Pública., 27, 271-6, 1993.
- [12] Kuczmarski, M.F., Kuczmarski, R.J., y Najjar, M. Effects of age on validity of self-reported height, weight, and body mass index: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. Journal of the American Dietetic Association., 101(1), 28-34, quiz 5-6, 2001.
- [13] 59ª Asamblea General. Declaración de Helsinki de la Asociación Médica Mundial: Principios éticos para las investigaciones médicas en seres humanos 2008. Disponible en: <http://www.wma.net/es/30publications/10policies/b3/>. [consultado el 13 de Enero de 2013].
- [14] Ministerio de Salud, Republica de Colombia. Resolución N° 008430 de 1993. Disponible en: http://www.dib.unal.edu.co/promocion/etica_res_8430_1993.pdf. [consultado el 13 de Enero de 2013].
- [15] Hildebrandt, T., Schlundt, D., Langenbucher, J., y Chung, T. Presence of muscle dysmorphia symptomology among male weightlifters. Comprehensive psychiatry., 47(2), 127–35, 2006.
- [16] Pope, H., Phillips, K., y Olivardia, R. The Adonis complex: the secret crisis of male body obsession. New York: Free press., 2000.
- [17] Olivardia, R. Body image and muscularity. en: Cash, T.F., Pruzinsky, T., eds. Body image: a handbook of theory, research, and clinical practice. New York: Guilford Press., 2002.
- [18] Marfil – Briceño, O., Cruz – Bojórquez, R., Vázquez – Arévalo, R., y Baile – Ayensa, J. Hábitos alimentarios de hombres con características de dismorfia muscular. Revista salud publica y nutrición., 11(4), 1 – 13, 2010.
- [19] Zepeda, P., Franco, P., y Valdés, M. Estado nutricional y sintomatología de dismorfia muscular en varones usuarios de gimnasio. Revista chilena de nutrición., 38(3), 260 – 7, 2011.
- [20] Pope, C., Pope, H., Menard, W., Fay, C., Olivardia, R., y Phillips, K. Clinical features of muscle dysmorphia among males with body dysmorphic disorder. Body Image., 2(4), 395-400, 2005.
- [21] Behar, R., y Molinari, D. Dismorfia muscular, imagen corporal y conductas alimentarias en dos poblaciones masculinas. Revista médica de Chile., 138(11), 1386-94, 2010.
- [22] Nieuwoudt, J.E., Zhou, S., Coutts, R.A., y Booker, R. Symptoms of muscle dysmorphia, body dysmorphic disorder, and eating disorders in a nonclinical population of adult male weightlifters in australia. J Strength Cond Res., 29(5), 1406-14, 2015.
- [23] Kouri, E., Pope, H., Katz, D., y Oliva, P. Fat-free mass index in users and nonusers of anabolic-androgenic steroids. Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine., 5(4), 223-8, 1995.
- [24] Galli, N., y Reel, J. Adonis or hephaestus? exploring body image in male athletes. Psychology of men & masculinity., 10(2), 95–108, 2009.

- [25] Kanayama, G., Barry, S., Hudson, J.I., y Pope, J.H.G. Body Image and Attitudes Toward Male Roles in Anabolic-Androgenic Steroid Users. *Am J Psychiatry.*, 163, 697–703, 2006.
- [26] Pope, H., Kanayama, G., Ionescu-Pioggia, M., y Hudson, J. Anabolic steroid users' attitudes towards physicians. *Society for the study of addiction.*, 99, 1189–94, 2004;
- [27] Mishkind, M., Rodin, J., Silverstein, L., y Striegel-moore, R. the embodiment of masculinity. *American behavioural scientist.*, 29, 545 – 62, 1986.
- [28] Veale, D., Gournay, K., Dryden, W., Boocock, A., Shah, F., Willson, R., et al. Bodydysmorphic disorder: Acognitive behavioural model and pilot randomised controlled trial. *Behaviour research and therapy.*, 34(9), 717–29, 1996.
- [29] Lacan, J. El estadio del espejo como formador de la función del yo [Je] tal como se nos revela en la experiencia analítica. . *Escritos.*, 1, 86 – 94, 1984.
- [30] Hudson, J., Hiripi, E., Pope, H., y Kessler, R. The prevalence and correlates of eating disorders in the national comorbidity survey replication. *Biological psychiatric.*, 61(3), 348-58. 2007.
- [31] Lantz, C., Rhea, D., y Mayhew, J. The drive for size: a psycho - behavioral model of muscle dysmorphia. *International sports journal.*, 5, 71- 86. 2001.
- [32] Martínez-Segura, A., Cortes – Castell, E., Martínez-Amoros, N., y Rizo-Baeza, M.M. [Nutritional risk factors to users in dysmorphia muscular strength of room]. *Nutr Hosp.*, 31(4), 1733-7, 2015.
- [33] Castro, L., y Iglesias, S. Aproximación teórica a una de las afecciones psicopatológicas del S.xxi: la vigorexia. *Iniciación a la Investigación (universidad de jaden) Revista Electronica.*, 5(2), 2010.
- [34] Grant, J.E. Commentary on: Muscle dysmorphia: could it be classified as an addiction to body image? *J Behav Addict.*, 4(1), 6 – 7, 2015.
- [35] Gonzalez-Martí, I., Fernández – Bustos, J.G., Hernández-Martínez, A., y Contreras –Jordan, O.R. Physical perceptions and self-concept in athletes with muscle dysmorphia symptoms. *Span J Psychol.*, 17, E43, 2014.
- [36] Kanayama, G., Pope, H.G.J., Cohane, G.H., y Hudson, J.I. Risk Factors For Anabolic-Androgenic Steroid Use Among Weightlifters: A Case /Control Study. *Drug and Alcohol Dependence.*, 71, 77 – 86, 2003.
- [37] Loosemore, D., y Moriarty, D. Body dissatisfaction and body image distortion in selected groups of males. *CAHPER Journal.*, 56(6), 11 – 5, 1990.
- [38] Dawes, J., Roozen, M., y Spano, M. Muscle dysmorphia. the NSCA [serial on the Internet]. Disponible en: www.nasca-lift.org. [consultado el 20 de Octubre de 2012].
- [39] Skemp, K.M., Mikat, R.P., Schenck, K.P., y Kramer, N.A. Muscle dysmorphia: risk may be influenced by goals of the weightlifter. *J Strength Cond Res.*, 27(9), 2427-32, 2013.