Original Article

Relationship between the pattern of consumption of nutritional supplements and the degree of bigorexia in bodybuilders of Metropolitan Lima

Relación entre el patrón de consumo de suplementos nutricionales y grado de vigorexia en fisicoculturistas de Lima Metropolitana

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ABSTRACT

In the world of bodybuilding, there is a high prevalence of muscle dysmorphia due to the pressure that participants in this discipline are exposed to strict diets, long training sessions, and the use of ergogenic aids can trigger an obsession that can negatively impact an individual's psychosocial well-being. The objective of this research was to determine the relationship between the pattern of nutritional supplement consumption and the degree of muscle dysmorphia in bodybuilders from metropolitan Lima. The study followed a non-experimental, correlational, prospective, cross-sectional design. The sample consisted of 30 bodybuilders from metropolitan Lima who were administered the "Adonis Complex Questionnaire" to determine their degree of muscle dysmorphia and the "Nutritional Supplement Pattern Questionnaire." All bodybuilders presented some degree of muscle dysmorphia: 53% moderate, 30% severe, 10% pathological, and 7% mild. All participants consumed nutritional supplements, primarily creatine (57%) and protein powder (54%). However, no statistically significant relationship was observed between supplement consumption patterns and the degree of muscle dysmorphia in bodybuilders from metropolitan Lima.

Keywords: Muscle dysmorphia, supplementation, bodybuilding.

RESUMEN

En el mundo del fisicoculturismo se presenta una alta prevalencia de vigorexia debido a la presión que los participantes de esta disciplina se someten. Las dietas estrictas, sesiones largas de entrenamiento y el consumo de ayudas ergogénicas pueden desencadenar una obsesión que puede influir negativamente en el área psico-social del individuo. El objetivo de la investigación fue determinar la relación entre el patrón de consumo de suplementos

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nutricionales y el grado de vigorexia en fisicoculturistas de Lima Metropolitana. El enfoque de la investigación fue cuantitativo no experimental de tipo correlacional y transversal prospectivo. La muestra estuvo conformada por 30 fisicoculturistas de Lima a quienes se les aplicó el "Cuestionario Complejo de Adonis" para conocer el grado de vigorexia y el "Cuestionario del patrón de consumo de suplementos nutricionales". Todos los fisicoculturistas presentaron algún grado de vigorexia, 53 % grado moderado, 30 % grado grave, 10 % grado patológico y 7 % grado leve. Todos consumían suplementos nutricionales, principalmente creatina (57 %) y proteína en polvo (54 %). Sin embargo, se observó que no existe relación estadísticamente significativa entre el patrón de consumo de suplementos y el grado de vigorexia en fisicoculturistas de Lima metropolitana.

Palabras claves: Vigorexia, suplementación, fisicoculturismo.

INTRODUCTION

Muscle dysmorphia, also known as bigorexia, is a subtype of body dysmorphic disorder characterized by a pathological concern about insufficient musculature and physical appearance (American Psychiatric Association, 2014). This condition primarily affects young males and is associated with excessive exercise behaviors, restrictive diets, and the use of supplements or anabolic substances (Cooper *et al*., 2020).

Previous studies have reported low prevalence rates of bigorexia in the general population, but higher rates among individuals who engage in strength training and bodybuilders (Cooper *et al*., 2020). Recent research has identified an association between the consumption of muscle-gain supplements and higher scores in muscle dysmorphia (Ganson *et al*., 2024).

Bodybuilding is a sport that requires consistency, effort, discipline, and sacrifice. It is based on the pursuit of muscular hypertrophy through methodical anaerobic training supported by scientific principles to increase muscle mass symmetrically, accompanied by a strictly calculated diet (Villavicencio, 2018). To improve performance in competitions, nutritional supplements are frequently used, which are optimal when combined with a dietary regimen to achieve specific nutrient goals and enhance athletic performance. However, supplements with limited scientific evidence are also commonly consumed, which is common among those practicing fitness sports (Moradi *et al*., 2024).

Nutritional supplements are classified annually by the Australian Institute of Sport (AIS, 2021) into four groups (A, B, C, and D) to evaluate the scientific evidence supporting ergogenic aids distributed in gyms and retail outlets. Group A includes supplements classified as safe for athletes with strong scientific evidence supporting their performance benefits. Group B includes supplements considered safe for athletes but lacking sufficient scientific backing. Group C includes supplements that do not provide benefits for athletes after thorough study. Finally, Group D includes supplements prohibited for athlete use due to a high risk of contamination with substances that may yield a positive result in anti-doping tests (AIS, 2021).

Given the pressure to achieve expected performance outcomes, this study aims to determine the relationship between the pattern of nutritional supplement con-

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MATERIALS AND METHODS

A non-experimental, cross-sectional, correlational, prospective study was conducted with bodybuilders who attended gyms in Metropolitan Lima in 2021. The study sample included 30 bodybuilders, selected through non-probabilistic convenience sampling. Inclusion criteria included an age range of 18–50 years, gym attendance in 2021, and participation in bodybuilding competitions. Individuals who did not wish to participate were excluded.

Data were collected through a virtual survey administered via Google Forms, after obtaining informed consent. The degree of bigorexia was assessed using the "Adonis Complex Questionnaire" validated by Latorre-Román *et al.* (2015), which measures bigorexia scores as follows: mild bigorexia from 0 to 9 points, moderate from 10 to 19, severe from 20 to 29, and pathological from 30 to 39.

To determine the supplements consumed and the purpose of their consumption, the "Nutritional Supplement Consumption Pattern" questionnaire validated by Gómez (2017) was applied. Based on the responses, supplements were classified according to the AIS 2021 categories: A, B, C, and D.

The data obtained were processed using the SPSS (Statistical Package for the Social Sciences) software, version 25, through descriptive statistics. To assess the relationship between the study variables in their categorical form, Fisher's exact test was used with a significance level of 0.05.

RESULTS AND DISCUSSION

After analyzing the data, it was observed that all participants were male. As shown in Table 1, half were in the 18 to 30-year age range, mainly students, while the other half were between 31 and 50 years old and, in addition to bodybuilding, were employed.

Table 1.
Age Range and Employment Status of Bodybuilders

Age	Occupation	n	%
18 - 30	Worker	5	17
	Student	10	33
31- 50	Worker	15	50
	Student	0	0
	Total	97	100

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Table 2.

Degree of Bigorexia According to the Adonis Complex Questionnaire in Bodybuilders

Degree of Bigorexia	n	%
Low degree	2	7
Moderate degree	16	53
Severe degree	9	30
Pathological degree	3	10
Total	30	100

In Table 2, it is shown that all surveyed bodybuilders exhibited some degree of bigorexia, with moderate bigorexia being the most common at 53%, while mild bigorexia accounted for only 7%. In the study by Devrim *et al.* (2018), which involved a larger population of bodybuilders, more than half (58%) were found to have bigorexia, without specifying the degrees. Similarly, when compared with studies of gym users who are not bodybuilders, the results differ. This is reflected in Hinojosa (2020), whose work showed that the prevalence of bigorexia in gyms was low, reaching only 1.5%. This can be explained by the fact that, although performance is a key factor in most sports, in bodybuilding it is not necessarily so, as it is not only about performance but also about appearance (Lambert, 2004). Both competitive and non-competitive bodybuilders are vulnerable due to the obsession with being more muscular and leaner (Cafri, 2008).
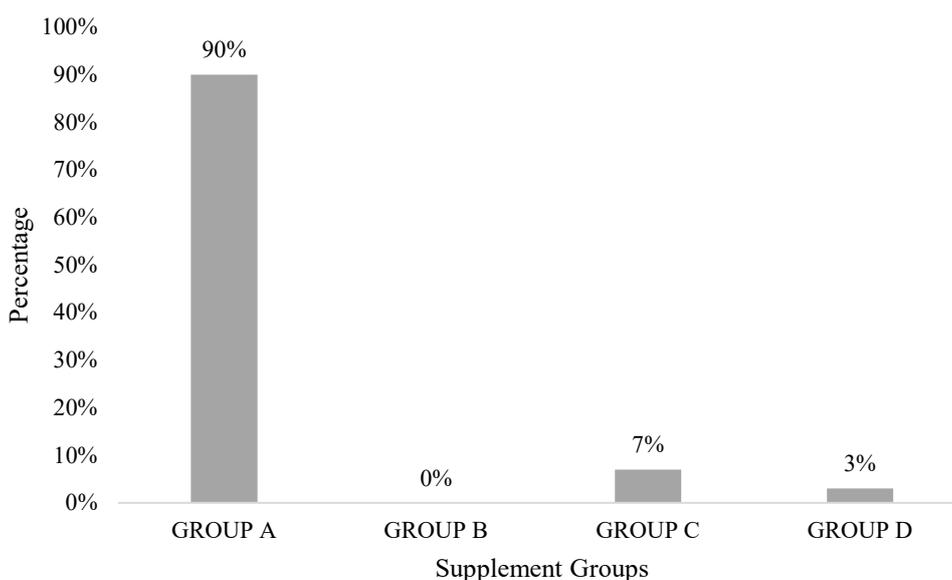

Figure 1. Percentage Distribution of Consumed Supplement Groups

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In Figure 1, it can be seen that bodybuilders have a higher consumption of Group A supplements, which is consistent with the fact that this group includes supplements with the strongest scientific evidence. This group includes proteins, vitamins and minerals, creatine, meal replacements, caffeine, carbohydrates, and guarana among the options in the survey applied in the present study. On the other hand, no participant reported consuming Group B supplements. In the study by Bermúdez (2023), most participants consumed nutritional supplements from Group A, highlighting protein as the most consumed (38.3%), followed by creatine (36.2%), and to a lesser extent, multivitamins (8.5%) and caffeine (2%). These findings also align with those in the present study, as shown in Table 3, where creatine and protein powder were the most consumed. Creatine is known for its ability to improve athletic performance, while protein powder helps achieve the recommended daily protein intake, thus promoting muscle mass gain.

Table 3.
Supplements Consumed by Bodybuilders

Type of suplements	n	%
Creatine	17	57
Protein en Powder	15	50
Hydroxycítric Acid	1	4
Arginine	2	8
Vitamins y Minerals	1	4
Total	30	100
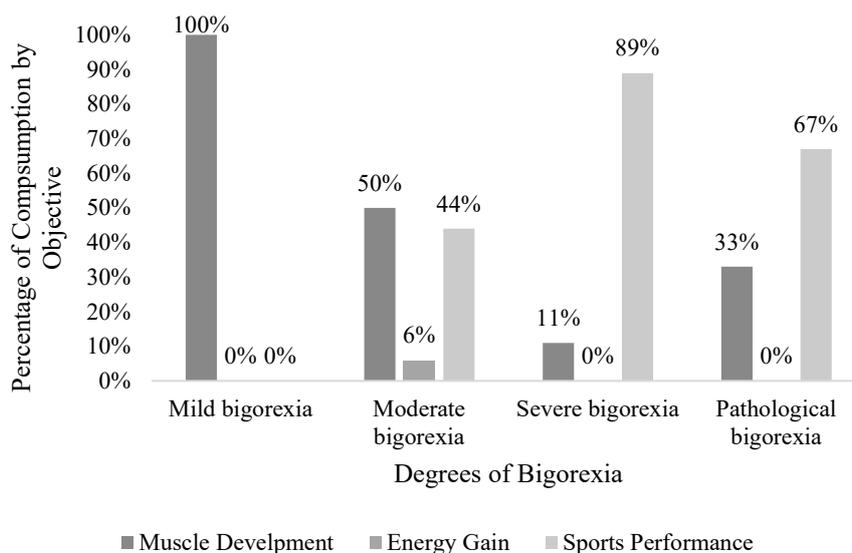
Figure 2. Objectives of Supplement Consumption According to Degree of Bigorexia

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Table 4.

Fisher's Exact Test for Objectives and the Adonis Complex Questionnaire

	Value	Df	Asymptotic Significance (Two-tailed)	Exact Significance (Two-tailed)
Pearson Chi-Square	8.292	6	0.217	0.233
Likelihood Ratio	9.798	6	0.133	0.128
Fisher's Exact Test	9.564			0.107
Linear-by-Linear Association	4.626	1	0.031	0.039
Number of Valid Cases	30			

When examining the relationship between degrees of bigorexia and the objectives of supplement consumption, Figure 2 reveals heterogeneous patterns. Among participants with mild bigorexia, all participants identified muscle mass development as their primary objective. By contrast, in the moderate bigorexia group, this goal was observed in only 50% of the participants, whereas the remaining participants prioritized sports performance, followed to a lesser extent by supplement consumption aimed at increasing energy levels.

Among individuals with severe and pathological bigorexia, the primary objective was improving sports performance, placing other objectives in a secondary position. According to Fisher's exact test (p = 0.107), there is no statistically significant relationship between the objectives of supplement consumption and the degrees of bigorexia.

These findings are consistent with observations reported in previous studies. For example, Alejo (2021) notes that individuals with more severe degrees of bigorexia often prioritize sports performance due to a distorted perception of physical self-efficacy, which may explain the higher prevalence of this objective in the severe and pathological bigorexia groups. Meanwhile, Gauciry (2019) found that muscle mass development is the predominant goal in men with mild degrees of bigorexia, which aligns with the results of this study. This pattern may be explained by the fact that, in the early stages of bigorexia, associated behaviors are more focused on aesthetic improvement, whereas in more advanced stages the emphasis shifts toward physical performance and competitive achievement.
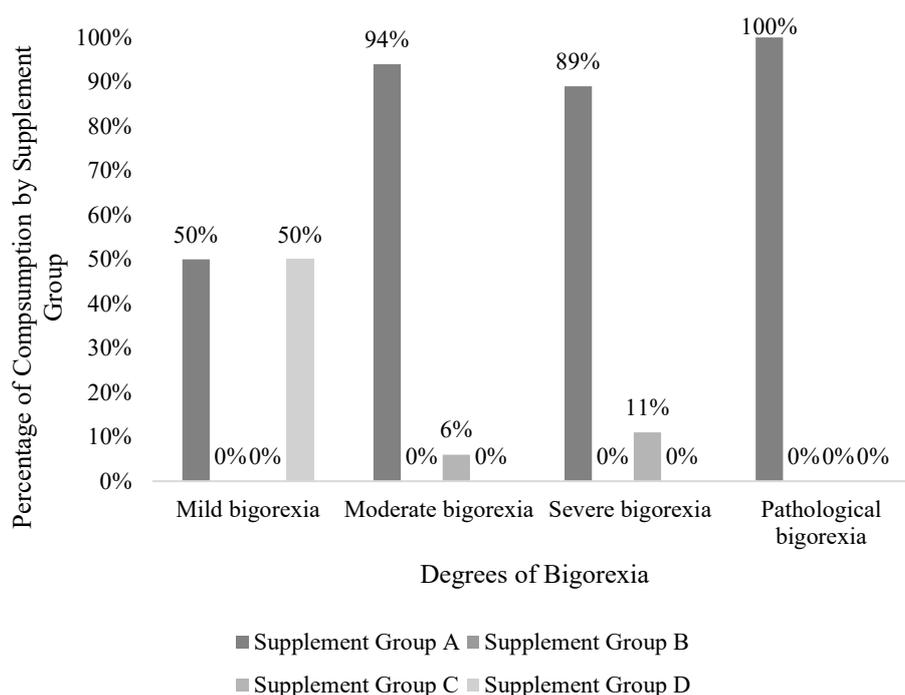
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Figure 3. Consumption of Supplement Groups According to Degree of Bigorexia

Table 5.
Fisher's Exact Test for Supplement Group and the Adonis Complex Questionnaire

	Value	Df	Asymptotic Significance (Two-tailed)	Exact Significance (Two-tailed)
Pearson Chi-Square	15.019	6	0.020	0.089
Likelihood Ratio	6.791	6	0.341	0.249
Fisher's Exact Test	8.385			0.220
Linear-by-Linear Association	1.768	1	0.184	0.171
Number of Valid Cases	30			

Figure 3 shows that Group A supplements were the most frequently used among participants, with 100% of participants in the pathological degree reporting their use, whereas use among the mild degree group reached 50%, lower than the aforementioned group. In contrast, participants in the mild group were the only ones who reported the use of Group D supplements (50%), whereas the other groups did not consume any (0%). Regarding Group C supplements, the moderate and severe groups were the highest consumers at 6% and 11%, respectively, compared to the mild and pathological groups, who did not consume them. This shows that Group A

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is the supplement group most consumed by respondents, across all degrees of bigorexia. According to Fisher's exact test ($p = 0.220$), no statistically significant association was identified between supplement group consumption and degrees of bigorexia. To date, no other study has investigated the degree of bigorexia with the different supplement groups as classified by the Australian Institute of Sport. However, in the study by Gonzales *et al.* (2021), when analyzing the relationship between supplement consumption and bigorexia, it was shown that supplement consumption is an independent variable from the risk of developing bigorexia. Although available evidence remains limited, due to the characteristics of Group A supplements, they were the most chosen for consumption in our study, likely because they have stronger scientific evidence supporting their use.

CONCLUSIONS

The results reveal that there is no statistically significant relationship between supplement consumption patterns and the degree of bigorexia among bodybuilders in Metropolitan Lima. However, bigorexia was identified in all participating bodybuilders at different degrees, with moderate bigorexia being the most prevalent. Additionally, all bodybuilders in the study consume nutritional supplements, with creatine and protein powder being the most consumed, belonging to Category A, which has the strongest scientific evidence according to the AIS classification.

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Author Contribution Statement

• Luis A. Fajardo: Data analysis and original draft.

• Álvaro J. Guerra: Writing, conceptualization, methodology.

• Gustavo Abad: Conceptualization, methodology, and project administration.