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ORIGINAL

SELF-PERCEPTION AND USE OF NUTRITIONAL SUPPLEMENTS IN GYM USERS

AUTOPERCEPCIÓN Y USO DE SUPLEMENTOS NUTRICIONALES EN USUARIOS DE GIMNASIOS

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ABSTRACT

Body image dissatisfaction can trigger excessive concern for physical appearance leading to indiscriminate use of nutritional supplements. Therefore, the objective of this study was to investigate the relationship between the perception and conformity of body image with the consumption of nutritional supplements in regular users of gyms in the Biobío Region, Chile. The research corresponds to a cross-sectional analytical study conducted in the second half of the year 2018, in 262 participants over 18 years old. A statistically significant association between the use of nutritional supplements and the perception of body image (OR 0.58, 95%CI 0.34–0.98; $p = 0.045$), and between the use of nutritional supplements and conformity with body image (OR 0.43, 95%CI 0.25–0.75; $p = 0.003$) was observed. In conclusion, the higher the body image dissatisfaction or the presence of an

altered perception of body image, the higher the consumption of nutritional supplements.

KEY WORDS: Physical conditioning; exercise; sports nutritional sciences; dietary supplements; self-image; body image.

RESUMEN

La insatisfacción con la imagen corporal puede desencadenar preocupación excesiva por la estética conduciendo a una utilización indiscriminada de suplementos nutricionales. Por ello, el objetivo de este estudio fue investigar la relación entre percepción y conformidad de imagen corporal al uso de suplementos nutricionales en usuarios regulares de gimnasios de la región del Biobío, Chile. La investigación corresponde a un estudio analítico transversal realizado en el segundo semestre del año 2018, en el que participaron 262 personas mayores de 18 años. Se observó una asociación estadísticamente significativa entre el uso de suplementos nutricionales y la percepción de la imagen corporal (OR 0,58, IC95% 0,34–0,98; $p=0,045$), y entre el uso de suplementos nutricionales y la conformidad con la imagen corporal (OR 0,43, IC95% 0,25–0,75; $p=0,003$). En conclusión, a mayor disconformidad con la imagen corporal o la presencia de una percepción alterada de ésta, mayor es la probabilidad de consumir suplementos nutricionales.

PALABRAS CLAVES: Acondicionamiento físico humano, ejercicio, ciencias de la nutrición y del deporte, suplementos dietéticos, autoimagen, imagen corporal.

1 INTRODUCTION

Diet and the perception of body image is a constantly evolving research topic that takes on greater relevance when there are changes that undermine health, and when they are also associated with physical activity and sport¹.

Food is recommended to be the main source to meet nutritional needs, but despite this, a large number of individuals prioritize the use of supplements over a balanced diet^{2,3}.

Dietary supplements are substances intended to help maintain and protect healthy physiological states⁴. They are often expensive, with little or no scientific evidence, and may even be harmful. Supplements are mainly used to improve sports performance, not only by professional level athletes, but also by gym users, a group with an increasing consumption of supplements and whose one of its main objectives is to achieve body composition changes⁶. Such changes may or may not be influenced by the perception of body image, which refers to how an individual sees their own body⁷, and since it is so subjective, it may not necessarily

correspond to the way others see them. Moreover, the perception of body image is influenced by several interacting factors, such as affective and personal experiences which shape and build self-esteem⁸. On the flip side, body image conformity corresponds to the assessment that a person has of their own image, which can be positive or negative, that is, content or satisfied, or, discontent or dissatisfied^{9,10}. In this context, low self-esteem and body image dissatisfaction, due to aesthetic stereotypes, together with the performance of physical exercise, with the aim of reducing body weight, can be conditioning factors for the development of some eating behavior disorders¹¹. It is believed that a slim figure is considered the maximum canon of beauty for women, which is also associated with power, longevity, youth, sexual attractiveness¹², as well as personal and professional success¹³. Conversely, the goal for men is to achieve the maximum muscle growth, being this, the main reason why they develop muscle dysmorphia, a disorder that has a prevalence of 13.6% among gym users in Chile, which is within the world average¹⁴. In the same way, the performance of physical exercise can be related, in many cases, to an improved self-perception of the general physical appearance, or its condition and strength¹⁵. Considering the above-mentioned information, it is extrapolated that a large number of users go to the gym, not for health reasons but mainly for aesthetics, which could also affect their eating habits¹⁶, including the use of certain types of supplements. For this reason, according to the literature, men consume nutritional supplements to increase their muscle mass^{17, 18}, whereas women use supplements first, to improve their health, and second, to decrease their body fat¹⁹.

Finally, in other studies it has been observed an association between nutritional supplements consumption and self-perception of body image, where those subjects who perceived themselves as eutrophic showed a higher consumption of supplements²⁰. Likewise, it has been found that among gym users, the higher their training frequency and volume are, the more sports supplements they use¹⁹.

Therefore, associating these self-perception variables and the state of body image conformity with the consumption of this kind of dietary supplements will set a precedent, both for an appropriate nutritional treatment of individuals who attend fitness centers, paying greater attention to the psychological component and not only to hard data on body composition and diet, and also for further research in the field of nutrition associated with physical activities and sports.

The aim of the present study is not only to provide regional data on the profile of the consumer of nutritional supplements of physically active subjects who attend gyms in the Biobío region of Chile, but also to provide data on gender differences in nutritional supplements consumption and also information on self-perception of body image and their state of conformity, taking into account that gym users are in an environment that could influence their self-esteem.

Finally, as stated above, the objective of this study is to examine the relationship between the perception of body image and its state of conformity and the consumption of nutritional supplements among gym users in the Biobío Region.

2 METHODOLOGY

This cross-sectional analytical study was conducted in regular users of 10 gyms in the provinces of Concepción and Biobío, VIII region, Chile in 2018.

This research was approved by the Scientific Ethics Committee at the Universidad Mayor de Santiago de Chile.

2.1 SAMPLE

The participants of this research were selected through a non-probability convenience sample, given the characteristics of the study population, which reflected a regular rotation of users, different training schedules, seasonal fluctuations and time inconsistency in the attendance of gym users. The sample size was determined to estimate proportions using a 95% confidence level, 5% maximum expected loss, 28% expected prevalence and 10% losses estimation, resulting in 374 subjects. The study response rate was 70.1%.

The inclusion criteria were: to attend the gym at least once a week, to have been a gym member for at least 3 months, and to be between 18 and 40 years old. Those who had a physical or mental disability that prevented them from answering the questionnaire, were illiterate and/or refused to sign the informed consent were excluded from this study.

2.2 PROCEDURE

The sample consisted of subjects of both sexes; all of them enrolled in one the following gyms: Body Power, Strong Fitness, Full EnerGym, Lincoyán, Power Gym, Flex and Taurus, in the Biobío Region. The gym administrators authorized this study to be carried out in their fitness centers.

Gym users were invited to take part in the study and they were informed about the objectives of the research and the procedure to be followed. All those who voluntarily agreed to participate in the study were asked to sign informed consent. It is worth mentioning that the questionnaire was applied in person at the gym, on days when the subjects attended training sessions. For this, each gym set up an individual room for this activity. Subjects answered the questionnaire by themselves and were able to consult the researchers in case of any doubts.

2.3 VARIABLES

The information was obtained by applying a data-collection instrument, previously validated in the Chilean population in a study conducted by Jorquera et al.,¹⁹ which included questions about socio-demographic variables, type of training and supplements consumption.

In order to obtain information on the socio-demographic variables of the study sample, the participants were asked to indicate their sex (man; woman), age (years old), educational level (primary education; secondary education; higher education) and income (<CLP \$550,000; ≥ CLP \$550,000).

In terms of training, subjects were asked to provide information on gym attendance frequency (<2 days a week; 3 to 5 days a week; >5 days a week) and time attending the gym (3 to 6 months; 6 to 12 months; >12 months).

Participants were asked if they consumed nutritional supplements, be it protein, vitamins or minerals (yes; no), and their purpose for supplement use (performance; aesthetics; health).

The Contour Drawing Rating Scale by Thompson & Gray²¹ was used to evaluate body image perception. It consists of nine male and nine female figures arranged in ascending size from left to right^{22,23} (Figure 1). According to this, the perception was classified as eutrophic and altered (individuals' perception of their nutritional status as underweight, overweight or obese). Likewise, they were consulted for the conformity regarding their body image (satisfied; dissatisfied).

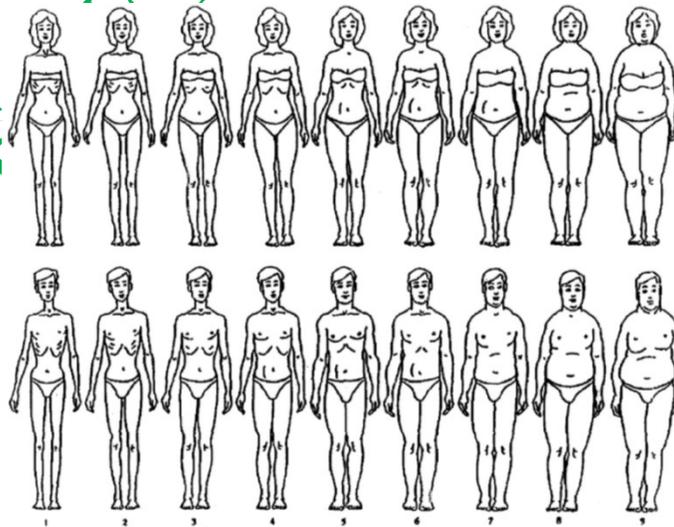


Figure 1. Contour Drawing Rating Scale (Thompson & Gray, 1995).

2.4 STATISTICAL ANALYSIS

Absolute frequencies and percentages were calculated for the descriptive analysis of the data. The Chi-Square test was applied in order to analyze differences according to sex. Odds ratios and respective 95% confidence intervals with logistic regression models were used to assess the link between nutritional supplements consumption and body image perception and conformity. First, an unadjusted model was used, followed by a second model adjusted for confounding factors such as sex and age.

The level of statistical significance was established at $p < 0.05$. Data were analyzed using STATA version 14 statistical software.

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3 RESULTS

Table 1. Characterization of gym users in the Biobío Region, Chile, 2018 N= 262

Variables	Sex		p- value Chi- square
	Women n (%)	Men n (%)	
Total	88	174	
Socio-demographics			
Age (years old)			
18 – 24	35 (39.77)	87 (50.00)	0.115
25 – 32	32 (36.36)	62 (35.63)	
33 - 40	21 (23.86)	25 (14.37)	
Educational Level			
Primary Education	1 (1.14)	1 (0.57)	0.878
Secondary Education	18 (20.45)	37 (21.26)	
Higher Education	69 (78.41)	136 (78.16)	
Income			
< CLP \$550,000	67 (76.14)	131 (75.29)	0.880
≥ CLP \$550,000	21 (23.86)	43 (24.71)	
Gym			
Gym Attendance Frequency(days/week)			
< 2	10 (11.36)	18 (10.34)	0.859
3 – 5	66 (75.00)	128 (73.56)	
> 5	12 (13.64)	28 (16.09)	
Time attending the gym (months)			
3 – 6	43 (48.86)	73 (41.95)	0.502
6 -12	12 (13.64)	23 (13.22)	
> 12	33 (37.50)	78 (44.83)	
Body Image			
Body Image Perception			
Eutrophic	57 (64.77)	90 (51.72)	0.044*
Altered	31 (35.23)	84 (48.28)	
Body Image Conformity			
Satisfied	42 (47.73)	103 (59.20)	0.078
Dissatisfied	46 (52.27)	71 (40.80)	
Nutritional Supplements			
Supplements Consumption			
No	66 (75.00)	100 (57.47)	0.005*
Yes	22 (25.00)	74 (42.53)	
Supplements Use Purpose			
No Consumption of Supplements	66 (75.00)	100 (57.47)	0.013*
Performance/Recovery	14 (15.91)	49 (28.16)	
Aesthetics	2 (2.27)	16 (9.20)	
Health	6 (6.82)	9 (5.17)	

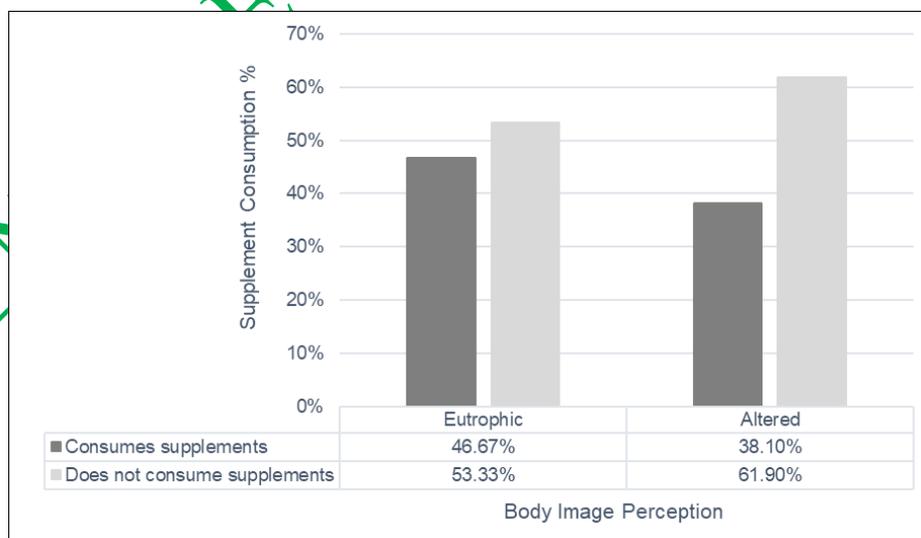
*p<0.05

Most of the women who participated in the study were between 18 and 32 years old, had a higher educational level (university or technical professional), and had an income of less than CLP \$550,000. Regarding men, it was observed that most of them were 24 years old or younger, had a higher educational level, university or technical professional, and their income was less than CLP \$550,000. A comparative analysis was performed to assess the sociodemographic variables between men and women and no statistically significant differences were found (Table 1).

Both men and women said that they attended the gym 3 to 5 times a week. Whereas men reported their total time attending the gym was longer than a year, women said they had been attending the gym for 3 to 6 months. No statistically significant differences were found for these variables according to sex (Table 1).

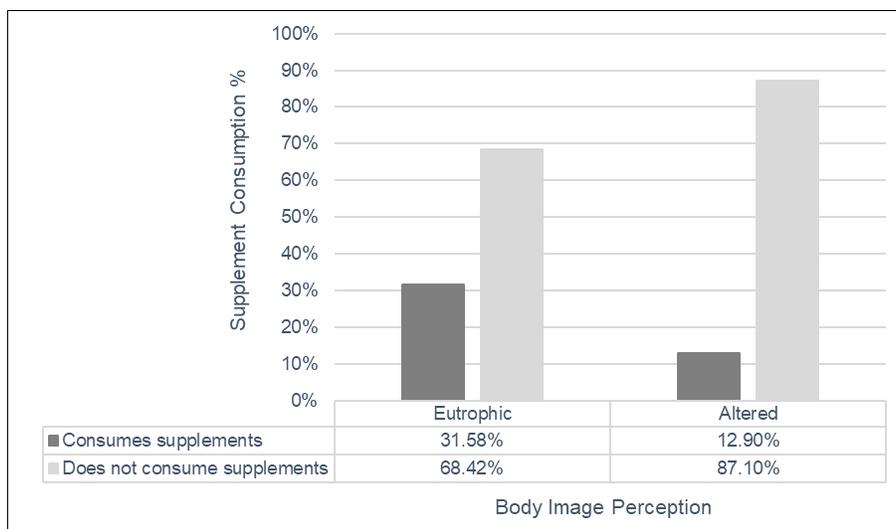
In terms of body image perception, both men and women reported having a eutrophic perception of themselves, nevertheless, there were statistically significant differences according to sex ($p < 0.05$), since women reported this more frequently than men (65% vs. 52%, respectively). Regarding body image conformity, most women informed they were discontent with their body image, whilst men were content with theirs, however, no statistically significant differences were found for this variable (Table 1).

When analyzing the consumption of nutritional supplements, it was found that only 25% of women consumed supplements, whereas over 40% of men reported taking them. Statistically significant differences ($p < 0.05$) were observed between men and women in terms of supplements use. When the participants were asked to state why they used supplements, performance was the main reason. There were also statistically significant differences ($p < 0.05$) according to sex (Table 1).



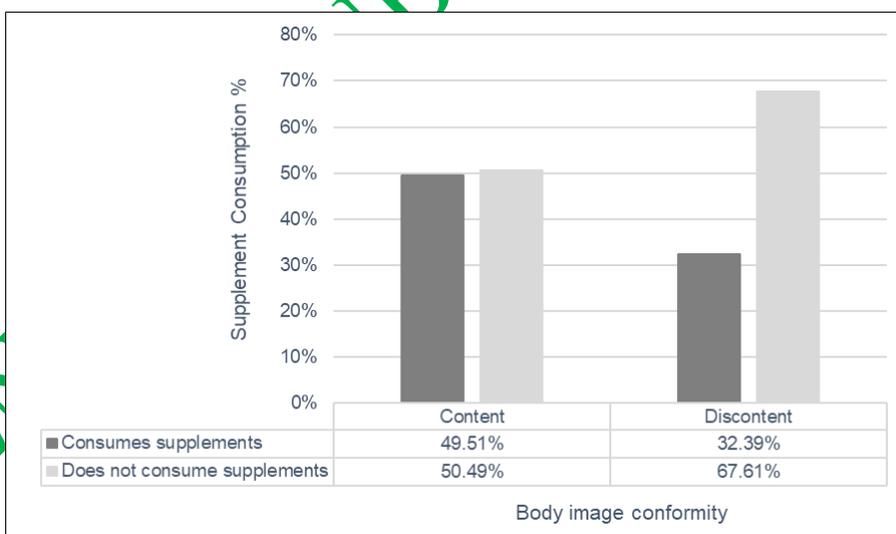
Graph 1. Nutritional supplements consumption according to body image perception in men who attended the gym in the Biobío Region, Chile 2018.

Nearly half of men (47%) had a eutrophic body image perception and consumed nutritional supplements, whereas only 38% of the subjects with an altered body image reported taking them (Graph 1).



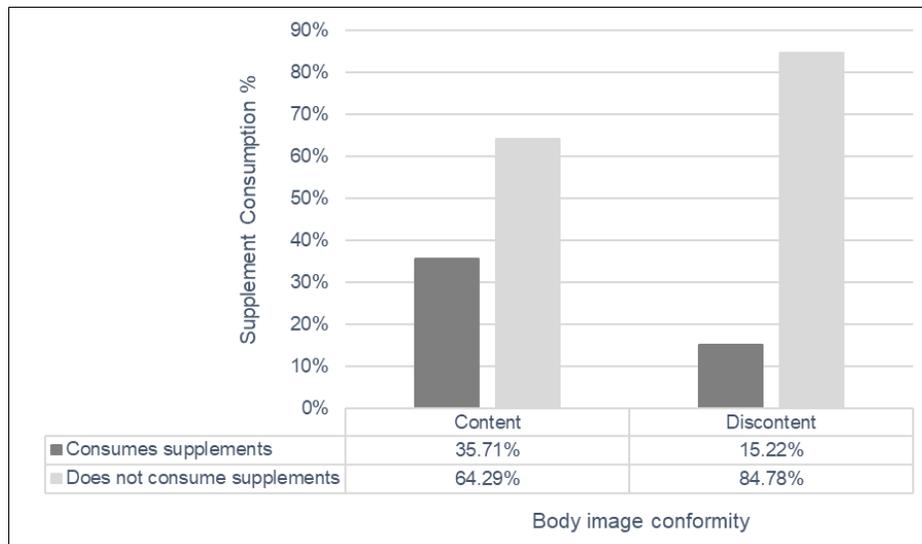
Graph 2. Nutritional supplements consumption according to nutritional status perception in women who attended the gym in the Biobío Region, Chile 2018.

32% of women who attended the gym and had a eutrophic body image perception reported taking supplements. Only 13% of those who had an altered body image perception reported taking them (Graph 2).



Graph 3. Nutritional supplements consumption according to the state of body image conformity in men who attended the gym in the Biobío region, Chile 2018.

With respect to body image, half of men who were content with their appearance and attended regularly the gym reported taking nutritional supplements. However, 67% of those who were discontent with their appearance reported not taking them (Graph 3).



Graph 4. Nutritional supplements use according to state of body image conformity in women who attended the gym in the Biobío Region, Chile, 2018.

36% of women who were content with their body image reported taking some type of nutritional supplement. Most of women who were discontent with their nutritional status and attended regularly the gym, reported not taking any supplements (Graph 4).

Table 2: Variables associated with nutritional supplements consumption in gym users in Biobío Region, Chile, 2018. N= 262.

		Nutritional Supplements	
		Odds ratio (IC 95%) ^a	Odds ratio (IC 95%) ^b
Body Image Perception			
	Eutrophic	Ref.	Ref.
	Altered	0.66 (0.39 – 1.10)	0.58 (0.34 – 0.98)*
Body Image Conformity			
	Content	Ref.	Ref.
	Discontent	0.41 (0.24 – 0.70)*	0.43 (0.25 – 0.75)*

CI: Confidence Interval; *p<0.05

a. Crude Logistic Regression Model.

b. Logistic Regression Model adjusted for sex and age.

A logistic regression model adjusted for sex and age was used to analyze the association between body image perception and nutritional supplements consumption. It was found that people who had an altered body image were more likely to consume some type of supplements. Similarly, the same was observed in relation to body image, namely those individuals who were discontent with their body image were more likely to consume nutritional supplements (Table 2).

4 DISCUSSION

Most of the participants of this research attended the gym regularly (3 to 5 days a week) and had a eutrophic body image perception. Men reported being satisfied with their body image, whereas women mainly reported being dissatisfied with theirs. On the other hand, it was observed that men consume more supplements than women, and the most frequent reason was to improve their performance. This was also described in another study on dietary and nutritional supplements consumption²⁴, as the second most frequent reason. This is related to the findings obtained in another research on the use of supplements in gym users in a university population¹⁸, in which the main reason for consumption of supplements in men was to increase or maintain muscle mass, strength and power. Likewise, body image perception and conformity was associated with a greater probability of using dietary supplements.

Men under 24 years old were the group with the highest gym attendance, a situation similar to that observed in another work conducted in 2011 in Chile²⁵. However, as seen in other studies, in the present research men and women showed the same frequency of training^{17,19,25}.

With respect to body image, both in this study as in another study conducted in university students¹³, it was found that the majority of the study population had a eutrophic body image perception. Nevertheless, in a study carried out in Mexican adults²⁶ it was observed that most of the surveyed subjects reported having an altered body image perception.

Concerning body image, in this study and in other works²⁷, it was observed that most men were content with their body image. Conversely, most women reported feeling discontent with theirs. These results are in agreement with those found by other authors²⁸. This situation could be partly explained by the amount of time attending the gym, since most of men had been attending the gym for 6 months or longer, while women had been gym members for a shorter period of time²⁰.

In terms of the consumption of nutritional supplements in gyms, in this study as in another study conducted in Chile in 2016¹⁹, only about one-third of the respondents used supplements. However, another work⁶ found a higher prevalence of supplements use in 2008. On the other hand, like other studies have found^{9,29}, the use of supplements was higher in men than in women. With regard to the reasons why they used nutritional supplements, the participants of this study reported the most important reason was to enhance physical performance, followed by aesthetics and finally health reasons. This contrasts with the findings of other authors²⁴, in which the majority of the participants said their main reason for taking supplements was to improve their physical appearance, then to protect their health and finally to improve their performance. In some studies, it has been observed that one the reasons for taking supplements is to achieve a specific goal, such as

losing body fat or increasing muscle mass. It has also been mentioned that in terms of body image dissatisfaction, men and women behave differently when choosing a supplement. Since men want to look stronger and women want to look slimmer, this prompts them to choose one or another supplement. Usually in the case of men, it is to increase or maintain muscle mass, strength, power, improve health, physical performance and to promote exercise recovery^{9,30}.

In a cross-sectional study conducted in Brazil²⁰, it was found that individuals with a eutrophic body image perception had a higher supplement use, thus, establishing a link between the use of supplements and a normal body image self-perception. Nevertheless, in the present study, although the majority of men and women reported a eutrophic self-perception, most of them also indicated not taking nutritional supplements. Only 29% of men and 17% of women, who were content with their body image, took some type of supplement. Moreover, unlike in the study mentioned above²⁰, it was noted that an altered perception of body image is associated with an increased likelihood of consuming nutritional supplements. Similar results were found by other authors³¹ in 2016 in a group of Brazilian athletes who had an altered body image. This could be partly explained by the high beauty standards in the world today, which can influence certain behaviors in order to improve the physical appearance such as, increasing the frequency of gym attendance or the use of nutritional supplements²⁷, as well as encouraging athletes to improve their physical performance³¹.

This study has strengths and methodological limitations. Among its strengths, it is one of the first studies to evaluate the link between nutritional supplements consumption and self-perception of body image in the Biobío Region, Chile. Limitations include its cross-sectional design, which does not allow inferring causality of associations, the use of convenience sampling that increases selection bias, and the use of a self-report data-collection instrument that increases the risk of social desirability response bias.

5 CONCLUSIONS

Despite the popular belief that gym users have high body image dissatisfaction coupled with a self-perception of their nutritional status inclined to overweight, a situation more frequent among women, in the present study it was observed that the perception of a eutrophic image predominated in both sexes. However, regarding body image conformity, it was noted that it was more frequent in men than women, since the latter mainly reported being dissatisfied with their body image¹⁶. On the other hand, both the state of body image conformity and body image perception were significantly associated with nutritional supplements use when adjusted for sex and age.

In order to shed light on the differences between men and women, as well as their reasons for using supplements, it is necessary to conduct longitudinal studies to better understand the differences and associations we found. With the aim of

providing accurate information to help gym users to consume supplements more effectively, enhance their performance, and reduce health problems associated with inappropriate use of nutritional supplements.

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