

# Excessive consumption of dietary supplements among professionals working in gyms in Pelotas, Rio Grande do Sul State, Brazil, 2012\*

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## Abstract

**Objective:** to investigate the prevalence and factors associated with excessive consumption of dietary supplements among professionals working at gyms in Pelotas, Rio Grande do Sul State, Brazil. **Methods:** this is a cross-sectional study with all local fitness professionals identified in 2012; excessive consumption of dietary supplements was defined as the use of three or more types of supplements simultaneously; multivariate analysis was carried out using Poisson regression with robust variance. **Results:** 497 professionals were interviewed; the prevalence of excessive consumption of dietary supplements was 10.5% (95%CI 7.9;13.5); there was association with the male sex (PR=3.2; 95%CI 1.6;6.7) and with length of time of dietary supplement consumption  $\geq 4$  years when compared to  $< 1$  year (PR=2.8; 95%CI 1.7;4.7); lower consumption was found among professionals with higher levels of education, regardless of whether they had a degree in physical education or not ( $p=0,007$ ). **Conclusions:** prevalence of excessive consumption of dietary supplements can be considered high and was associated with sociodemographic variables.

**Key words:** Dietary Supplements; Physical Education and Training; Motor Activity; Nutrition Surveys; Cross-Sectional Studies.

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## Introduction

The consequences of non-communicable diseases (NCDs) represent a set of Public Health problems. The World Health Organization (WHO) estimates that NCDs were responsible for 63% of a total of 38 million deaths worldwide in 2012.<sup>1</sup> In Brazil, the NCDs are equally relevant, and were responsible for 72.0% of the deaths occurred in 2007. Cardiovascular diseases, cancer and diabetes have stood out: 31.3%, 16.3% and 5.2% of deaths, respectively.<sup>2</sup>

According to the WHO, a small group of risk factors are responsible for a great amount of deaths caused by NCDs and for a substantial fraction of the burden of diseases due to these conditions. Some of these factors are smoking, heavy drinking, inadequate diets and physical inactivity.<sup>1</sup>

### *The reckless consumption of supplements could represent a health problem to its users.*

In the search for healthier habits, which include a balanced diet combined with regular physical activities, gyms are gaining space as specialized organizations to provide physical activities and sports services.<sup>3</sup> However, at gym's environment, it is common to see body-esthetic stereotypes reinforced,<sup>4</sup> which could represent another type of risk to gym clients, who could be induced to adopt inadequate diets and indiscriminate use of dietary supplements.<sup>5</sup>

Usually, professionals who work at gyms suffer from esthetic pressure and many of them yield to the use of substances which will allow them to achieve the body they long for.<sup>6</sup> In 2005, Palma and Assis<sup>6</sup> pointed out in their study that 25% of fitness professionals in Rio de Janeiro had used, at least once, metabolic accelerators and anabolic-androgenic steroids, and they reported using those substances for considering their bodies as a way to show their work. Because of this self-representation, they end up spreading the use of unnecessary products, which goes against the commandments of their profession: to promote health and well-being of their clients.<sup>5,7</sup>

Previous studies<sup>7,8</sup> have showed that the gym environment favors the use of dietary supplements, besides suggesting that the prescription of those products is done by some instructors. The hypotheses which explain such conduct are based on the profit obtained with the commercialization

of the supplements inside gyms, due to the direct contact between client and instructor,<sup>9</sup> based on the fact that the client sees in his or her instructor the body they long for;<sup>6</sup> and this is eased by the unavailability of nutritionists in these environments.<sup>10</sup>

According to the Ministry of Health, dietary supplements are used as complements of calories and/or nutrients to the diet of a healthy person, for cases in which ingestion through food is insufficient or the diet needs supplements.<sup>11</sup> The Brazilian Health Surveillance Agency (Anvisa) has alerted about the consumption of such supplements because, as they are produced in several countries with different regulations, they can contain prohibited substances in their composition. Furthermore, they may have deceptive information in their labels, besides causing harm to consumers' health, such as addictiveness, toxic effects on the liver, kidney failure, metabolic dysfunctions, cardiac abnormalities, alterations on the nervous system and, in some cases, even death.<sup>12</sup> Therefore, the reckless consumption of supplements could represent a health problem to its users.<sup>13</sup>

The present study aimed to investigate the prevalence and the factors associated to the excessive use of dietary supplements by fitness professionals in Pelotas-RS, Brazil.

## Methods

This is a cross-sectional census-type study, on data collected directly from fitness professionals in the urban area of Pelotas-RS, in 2012.

All gyms (regardless of size) in the urban area of Pelotas were visited. The total number of gyms in the municipality was obtained from two different sources. The first source was the records of this type of establishment registered in the Town Hall of Pelotas-RS. After this search, we mapped the city (through active search) in order to find the establishments which, for some reason, were not registered. The urban area of the municipality was divided into 19 census tracts, and agents were sent to identify establishments not found in the city records. Each agent also acted with key-informants in their respective work areas (pharmacies, bars, supermarkets, taxi drivers, among others), who helped find unregistered gyms. A total of 170 gyms were spotted; 569 professionals who were responsible for the physical activities available at those gyms were identified (owners, teachers, workers authorized by the profession board or interns).

The professionals who took part of the study were the instructors (with or without a higher education degree in Physical Education, authorized by the profession board or not) who taught classes with choreographed exercises using dumbbells, trendy activities in the media or in the fitness world, personal trainers, teachers of several modalities of gymnastics, weight lifting instructors, fight instructors, workers who used elliptical bicycles to promote physical activities and workers who taught dance, Pilates gymnastics/stretching, yoga and water activities.

After mapping the gyms in the city, we made a first contact with each establishment to collect basic information and present the aims of the research, whose approach was based on scheduled interviews with professionals identified by the gyms.

Physical education university students (n=20) were the interviewers, after having attended a 20-hour training course to standardize the procedure of data collection.

The professionals who could not be found at the gyms after three attempts were considered as losses; those who refused to answer the questionnaire even after an attempt by the supervisor of data collecting were considered refusals.

The study outcome was the excessive consumption of dietary supplements (protein, carbs, anti-catabolic, multivitamins, and hormones), defined as current consumption (at the time of the interview) of three or more types of these substances simultaneously.<sup>14-16</sup> The independent variables collected through open questions were:

- sex (male; female);
- age (in years);
- education level (up to complete high school; Physical Education student; higher education degree in Physical Education; higher education degree in other area);
- marital status (with or without a partner);
- length of time in the profession (months/years);
- modality of work at the gym (weight lifting instructor; personal trainer/ autonomous/space renter; fight; Pilates; gymnastic; water activities; yoga; dance; others);
- advices to clients about the consumption of dietary supplements (yes; no);
- period of time using dietary supplements (months/days); and
- reasons which have led them to use dietary supplements (remain healthy; improve their sports performance; gain muscle mass; have more energy/reduce fatigue; prevent or treat diseases and injuries; reduce stress; lose weight; correct bad eating habits; others).

The database was structured and data were double typed at Epi Info 6.1, which also verified errors and inconsistencies. Afterward, this database was exported to the statistics software Stata 12.0, used for the analysis. In the crude analysis, Pearson's chi-square test and chi-square test for linear trend were applied. Multivariate analysis was performed through Poisson regression, with robust variance, and the variables were placed in the same level for backwards selection. A 5% significance level was adopted.

The Ethics Research Committee of Physical Education of the Federal University of Pelotas has approved this project, under the Protocol No. 021/2011 (approved on October 12, 2011). All individuals were guaranteed the right of refusal and confidentiality over the information given. Those who agreed to participate in the study signed a Term of Free and Informed Consent.

## Results

A total of 497 professionals were interviewed, and there were 9% of losses and refusals. More than half of the sample were males (57.9%), aged between 20 and 29 years old (57.5%), with a higher education degree in Physical Education (53.3%) and did not live with a partner (70.6%). However, 29% of the sample did not have a degree in the specific area (workers with no degree but with authorization of the Physical Education Regional Board to work; students of Physical Education and other individuals illegally exercising the profession) (Table 1).

With regard to the evaluated characteristics of work, approximately three quarters (72.5%) had been exercising the profession for less than 10 years. The most frequent modality of classes amongst the professionals was weight lifting (48.3%), followed by personal trainer (38.9%). More than half of the professionals who used dietary supplements had started taking them four years before or earlier (63.2%) and the main reasons for using supplements were to remain healthy, improve their sports performance and to have more energy/reduce fatigue. Amongst the professionals evaluated, 10.5% excessively consumed dietary supplements (three or more simultaneously) and 37.8% of the professionals interviewed advised their clients to take dietary supplements (Tables 2 and 3).

After the adjusted analysis, the remaining associated variables were 'sex' (men presented probability of

**Table 1 – Sociodemographic characteristics of fitness professionals (n=497) in Pelotas-RS, 2012**

Sociodemographic characteristics	n	%
<b>Sex</b>		
Male	288	57.9
Female	209	42.1
<b>Age (in years)</b>		
<20	17	3.4
20-29	286	57.5
30-39	139	28.0
≥40	55	11.1
<b>Education level</b>		
Up to complete high school	51	10.3
Physical education students	93	18.7
Higher education degree in Physical Education	265	53.3
Higher education degree in another area	88	17.7
<b>Marital Status</b>		
With a partner	146	29.4
Without a partner	351	70.6

excessive consumption 3.2 times higher than women (95%CI 1.6;6.7;  $p<0.001$ ) and 'education level' (inverse linear trend between excessive consumption and education level;  $p=0.007$ ) (Table 3).

Observing the association of excessive consumption of dietary supplements according to the variables related to work, an increasing linear trend was identified in the excessive consumption of dietary supplements regarding the time progress ( $p=0.003$ ), and those professionals who reported the consumption of dietary supplements for four years or more presented a 2.8 higher probability of consumption (95%CI 1.7;4.7), in comparison to those who had been taking supplements for less than a year. Furthermore, those who consumed dietary supplements in excess showed a 70.0% higher probability (95%CI 1.1;2.7) of advising their clients to use these types of substances ( $p<0.001$ ) (Table 3).

## Discussion

The present study showed prevalence and factors associated with excessive consumption of dietary supplements amongst fitness professionals in Pelotas-RS. The findings indicated that approximately one in ten individuals consumed supplements in excess. The prevalence of excessive consumption was higher among

male professionals, without a higher education degree and who had been taking dietary supplements for four years or more. Of these professionals, 37.8% used to advise their clients on the use of dietary supplements.

Some important aspects of the present study which differ from previous studies should be highlighted: its uniqueness, because it is a census referring to fitness professionals in a medium-sized municipality in the southern Brazil, besides the careful logistics and the low proportion of losses and refusals. In this sense, it was difficult to discuss the results, because previous Brazilian studies were conducted with convenience sampling and in gyms located exclusively in the central area of the studied municipalities.<sup>17-23</sup> However, the following limitations should be mentioned: possibility of selection bias (losses and refusals could be related to health conditions caused by the use of dietary supplements); and the possibility of information bias (self-reported information with a tendency by the individuals of giving socially acceptable answers).

The reported prevalence of excessive consumption of dietary supplements is close to one reported by Goston and Correia in 2010,<sup>14</sup> in a study with representative samples of practitioners of physical activities offered at gyms of Belo Horizonte-MG, where 12.9% of individuals consumed dietary supplements in excess, having similar criteria to the present study.

**Table 2 – Description of work characteristics of fitness professionals (n=497) in Pelotas-RS, 2012**

Work characteristics	N	%
<b>Time (s)he has been working in a gym (in years)</b>		
<1	57	11.5
1-9	303	61.0
10-19	102	20.5
≥20	35	7.0
<b>Types of physical activities taught <sup>a</sup></b>		
Weight lifting	241	48.3
Personal trainer	194	38.9
Fight classes	77	15.4
Gymnastics	83	16.6
Dance	33	6.6
Others	21	4.2
<b>Excessive consumption of dietary supplements</b>		
No	444	89.5
Yes	52	10.5

a) The sum of the percentages is superior to 100%, due to the possibility of working in more than one modality.

However, the prevalence of excessive consumption of dietary supplements showed in the present research was inferior to the one reported in the study of Schneider et al., in 2014,<sup>17</sup> when, in a sample of 30 Physical Education professionals from six gyms in Guarapuava-PR, 44.0% reported using from two to five types of dietary supplements and 16.0% used more than five types. The difference between the prevalence in the present study and in the report by Schneider et al.,<sup>17</sup> probably owes to the small sample size, both in numbers and types of gyms included in that research, which could have overestimated the results.

In Pelotas-RS, the excessive consumption of dietary supplements by the interviewed professionals presented a prevalence of 10.5%, mostly among male individuals, weight lifting instructors and personal trainers, and those without a higher education degree in Physical Education. The clients of modalities which involve strength/muscle gain, probably, searched for professionals with stereotyped bodies,<sup>24</sup> a fact that would influence the consumption of dietary supplements. These products must always be prescribed by qualified professionals,<sup>25</sup> and its excessive use is to be avoided. It is also important to highlight that the dietary supplements should be recommended in situations of physical exercises with high energy output and/or risk of dehydration, and when there is nutritional deficiency, situations which are not always

present in users of dietary supplements. Taking into account the high economic status of the gym clients,<sup>3</sup> these users of nutritional ergogenic products are those with less consumption needs.<sup>14</sup>

The result found in this study revealed an abusive consumption of dietary supplements, higher among men (15.0%), corroborating other studies that showed a higher prevalence of consumption of dietary supplements among men, both professionals<sup>18-20</sup> and gym clientes.<sup>14</sup> Literature has proved that men are more interested in ergogenic resources to increase physical performance, strength, muscle tone and shorter recovery time,<sup>26</sup> which makes them more exposed to the excessive consumption verified in this kind of environment.

The age group from 20 to 29 was the most prevalent in fitness professionals, representing more than half of the interviewed group. A qualitative study, conducted with fitness professionals in Rio de Janeiro-RJ, in 2011,<sup>24</sup> reported that this job market selects younger professionals because it considers a supposed expectation of the clients on an esthetic model to be followed. In turn, the excessive consumption of dietary supplements showed a similar distribution among the different age groups, similar to what was found among practitioners of gym modalities in Belo Horizonte-MG.<sup>14</sup>

The fact that not all professionals had a specific degree to work in the area stands out, given the high

**Table 3 – Association between excessive consumption of dietary supplements with sociodemographic variables among fitness professionals (n=497) in Pelotas-RS, 2012**

Sociodemographic variables	Excessive consumption of dietary supplements			
	%	Crude analysis PR <sup>a</sup> (IC95%) <sup>b</sup>	Adjusted analysis PR <sup>a</sup> (IC95%) <sup>b</sup>	P-value
<b>Sex</b>				<0.001 <sup>c</sup>
Female	4.3	1.0	1.0	
Male	15.0	3.5 (1.7;7.0)	3.2 (1.6;6.7)	
<b>Age (in years)</b>				0.900 <sup>c</sup>
<20	11.8	1.0	1.0	
20-29	10.2	0.9 (0.2;3.3)	1.3 (0.3;5.4)	
30-39	11.5	1.0 (0.2;3.9)	1.3 (0.3;5.6)	
≥40	9.1	0.8 (0.2;3.6)	1.6 (0.2;5.2)	
<b>Education level</b>				0.007 <sup>d</sup>
Up to complete high school	21.6	1.0	1.0	
Physical education students	15.1	0.7 (0.3;1.4)	0.8 (0.4;1.7)	
Higher education degree in Physical Education	8.3	0.4 (0.2;0.7)	0.5 (0.2;1.0)	
Higher education degree in another area	5.7	0.3 (0.1;0.7)	0.3 (0.1;1.0)	
<b>Marital Status</b>				0.700 <sup>c</sup>
With a partner	9.6	1.0	1.0	
Without a partner	10.9	1.1 (0.6;2.0)	1.2 (0.7;2.3)	
<b>Length of time (s)he has been working in a gym (in years)</b>				0.200 <sup>c</sup>
<1	5.4	1.0	1.0	
1-9	11.9	2.2 (0.7;7.0)	1.1 (0.4;3.2)	
10-19	11.8	2.2 (0.6;7.4)	0.8 (0.3;2.4)	
≥20	2.9	0.5 (0.6;4.9)	0.4 (0.1;2.7)	
<b>Length of time using dietary supplements (in years)</b>				0.003 <sup>d</sup>
<1	24.2	1.0	1.0	
1-3	38.5	1.6 (0.9;2.7)	1.7 (1.0;2.8)	
≥4	63.2	2.6 (1.6;4.2)	2.8 (1.7;4.7)	
<b>Advices the consumption of dietary supplements</b>				<0.001 <sup>c</sup>
Yes	37.8	1.6 (1.1;2.7)	1.7 (1.1;2.7)	
No	5.8	1.0	1.0	
<b>Works with weight lifting</b>				0.090 <sup>c</sup>
Yes	12.9	1.6 (0.9;2.6)	1.3 (0.8;2.2)	
No	8.2	1.0	1.0	
<b>Works as personal trainer</b>				0.300 <sup>c</sup>
Yes	12.4	1.3 (0.8;2.3)	0.8 (0.5;1.3)	
No	9.2	1.0	1.0	
<b>Works with a modality of fight</b>				0.700 <sup>c</sup>
Yes	9.2	0.9 (0.4;1.8)	1.0 (0.2;2.2)	
No	10.7	1.0	1.0	
<b>Works with gymnastics</b>				0.060 <sup>c</sup>
Yes	14.5	1.5 (0.8;2.7)	1.7 (1.0;2.8)	
No	9.7	1.0	1.0	
<b>Works with dance</b>				0.100 <sup>c</sup>
Yes	3.0	0.3 (0.1;1.9)	0.6 (0.1;3.1)	
No	11.0	1.0	1.0	
<b>Works with other physical activities</b>				0.400 <sup>c</sup>
Yes	4.8	0.4 (0.1;3.0)	1.0 (0.3;2.5)	
No	10.7	1.0	1.0	

a) PR: prevalence ratio

b) Variables adjusted

c) Wald Test for heterogeneity

d) Wald Test for linear trend



amount of instructors without a higher education degree in Physical Education (46.7%). Furthermore, professionals with less schooling were those who most consumed dietary supplements in excess. A hypothesis for this finding could be the probable lack of scientific information, which makes those workers susceptible to pressure of the media and job market. This finding seems to oppose previous studies conducted with different samples,<sup>20,21</sup> which showed that gym clients with higher education levels were the ones who consumed more dietary supplements.

With regard to the length of time of dietary supplements consumption, there was a direct association with excessive consumption between professionals who had been taking those products for four years or more. No well-conducted studies that could verify the same findings amongst fitness professionals were found. Notwithstanding, the behavior on dietary supplements consumption by those professionals seems to be similar to the behaviors of gym clients. Goston,<sup>27</sup> in study with more than a thousand practitioners of physical activities in gyms in Belo Horizonte-BH, concluded that those that had been practicing longer showed 77.0% more odds of consuming dietary supplements (OR=1.77 95%CI 1.38;2.28) than individuals with less time dedicated to those activities. Another study, conducted with gym clients in São Paulo-SP, reported higher consumption of dietary supplements among those who had been exercising and attending gyms for longer.<sup>7</sup> Apparently, as time of practicing increases, the individual is more exposed to the consuming environment and, consequently, they tend to search for dietary supplements to reinforce the effects of their training.<sup>8,28</sup>

This study found a significant association between excessive consumption of dietary supplements and advices towards it: among professionals who abusively used these substances, there were those who stimulated their clients to do the same. Moreover, considering that most professionals who excessively consumed dietary supplements had up to high school degree, possibly most of the advices given on the use of these products have come from people who, besides not being trained to do so (not having a higher education degree in Nutrition), had low education level. With regard to the prescription of dietary supplements, previous studies assigned to the physical educators the onus of prescribing the use of ergogenic resources at gyms. In this sense, well conducted studies, performed

with representative groups of gym practitioners in Brazilian capitals,<sup>5,7,14</sup> pointed that even where there were nutritionists available, self-prescription of supplements was more frequent than prescription done by nutritionists or personal trainers.

All in all, professionals who consumed dietary supplements in excess were those who worked with gymnastics classes, weight lifting and personal training. A hypothesis for such finding is the high amount of working hours and the need of extra energy to maintain vitality and excitement during classes. This hypothesis is reinforced when we verify that the main reason stated by the professionals interviewed for the consumption of dietary supplements was to stay healthy. When revising the extensive international literature on practitioners of gym modalities, we can observe the same: individuals who most used dietary supplements were those who worked out longer.<sup>7,28,29</sup> However, we could not find similar studies conducted in Brazil.

The present study found that excessive consumption of dietary supplements was higher among male professionals, with no higher education degree and who had been taking dietary supplements for four years or more. More than a third of the professionals who consumed these substances in excess reported that they used to advice their clients to take the same substances.

Besides not bringing any advantages to physical performance, the excessive consumption of dietary supplements could cause damages to health and its prescription is supposed to be done only by nutritionists. Fitness professionals are supposed to correctly guide on the effects of the abusive consumption of these substances on a person's health. Actions to qualify less prepared professionals and the supervision of the Regionals Boards of Physical Education are necessary, so professionals can be warned about the risks of excessive consumption of dietary supplements and withdraw individuals who illegally exercise this profession from the job market.

### Authors' Contributions

All the authors contributed to the study conception and design, analysis and interpretation of the results, writing and relevant critical review of the intellectual content. They approved its final version and declared to be responsible for all aspects of the study, ensuring its accuracy and integrity.

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