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VALIDATION OF A QUESTIONNAIRE TO ASSESS STRESS, TOBACCO USE, PHYSICAL ACTIVITY, AND DIETARY SUPPLEMENTATION

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RESUMO

Introdução: Diante da grande expansão de academias, são necessários instrumentos confiáveis para avaliar e obter informações acerca do comportamento de praticantes de academia, podendo esses instrumentos serem capazes de auxiliar na implementação de planejamento e estratégias de promoção da saúde para essa população. Objetivo: Desenvolver e validar um questionário para avaliar os hábitos de vida, a atividade física e a suplementação dietética de praticantes de academia. Materiais e Métodos: Foi desenvolvido um questionário de 44 itens. A técnica Delphi foi utilizada para validar o conteúdo e a aparência usando o índice de validade do conteúdo (IVC). A validade construtiva foi verificada pela análise fatorial exploratória (AFE) em várias fases. A análise de confiabilidade foi avaliada pela consistência interna e reprodutibilidade temporal usando o alfa de Cronbach e o coeficiente de correlação intraclasse (CCI), respectivamente. Resultados: Duas rodadas da técnica Delphi identificaram um IVC total de 100%. O modelo final foi composto de oito itens, com excelente qualidade no ajuste do AFE, e distribuído em quatro fatores. A consistência interna foi adequada em todos os fatores, com CCIs 0,997, 0,916, 0,698, e 0,631. Conclusões: Este estudo fornece um questionário confiável e válido para avaliar o estresse, o consumo de fumo, a atividade física e a suplementação dietética de praticantes de academia.

Palavras-chave: Suplementos dietéticos. Estudo de avaliação. Atividade física. Psicometria. Estudo de validação.

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ABSTRACT

Validação de questionário para avaliação de estresse, tabaco, atividade física e suplementação alimentar

Introduction: Given the large expansion of gyms, reliable instruments are needed to assess and obtain information about the behavior of gym members, and these instruments may be able to assist in the implementation of planning and health promotion strategies in this population. Objective: To develop and validate a questionnaire to assess the lifestyle habits, physical activity, and dietary supplementation of gym members. Materials and Methods: A 44-item questionnaire was developed. The Delphi technique was used for content and appearance validity using the content validity index (CVI). Construct validity was verified by exploratory factor analysis (EFA) in several phases. Reliability analysis was assessed by internal consistency and temporal reproducibility using Cronbach's alpha and the intraclass correlation coefficient (ICC), respectively. Results: Two rounds of the Delphi technique identified a total CVI of 100%. The final model was composed of eight items, with excellent quality in the EFA adjustment, and distributed into four factors. Internal consistency was adequate in all factors, with ICC 0.997, 0.916, 0.698, and 0.631. Conclusions: This study provides a reliable and valid questionnaire to assess stress, smoking, physical activity, and dietary supplementation of fitness center members.

Key words: Dietary Supplements. Evaluation Study. Physical Activity. Psychometrics. Validation Study.

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INTRODUCTION

Health maintenance and disease prevention are strongly associated with the regular practice of physical activity (Warburton, Bredin, 2017).

To promote the benefits of physical activity, the World Health Organization (WHO, 2018) has increasingly encouraged the practice of activities such as walking, cycling, active recreation, sports, and games for all ages. For healthy individuals, some of these benefits are maintaining body weight and preventing diseases such as cancer and diabetes (Christie, Seery, Kent, 2016).

In recent years, the search for an active lifestyle has led to a growing number of fitness center members (Dart, Nguyen, Colditz, 2016).

An active lifestyle has been identified as essential to maintain physical, social, and mental health and to have a longer life expectancy (Moore and collaborators, 2012).

Moreover, chronic disease prevention programs that include physical activity have also shown significant benefits for quality of life (Penn and collaborators, 2018).

These rising physical activity levels, however, have also been associated with increased consumption of dietary supplements, especially among fitness center members aiming for better performance in strength, endurance, and/or muscle mass gain (Jawad and collaborators, 2017).

The desire to quickly achieve these objectives often leads to indiscriminate use of these food supplements, which is not professionally guided and supervised in most cases (Biggs and collaborators, 2017).

According to the Food and Drug Administration (FDA), an organization of the United States, dietary supplements are products designed to complement the diet, adding more nutritional value to it.

However, existing data indicate that few dietary supplements have shown any clinically relevant efficacy, requiring further research (Bailey and collaborators, 2013, Dubnov-Raz, Lahav, Constantini, 2011).

Obtaining information about fitness center attendants is essential considering the increased demand for physical activity in these places.

This allows observing the factors that influence the consumption of dietary supplements Liz, Andrade, (2016) and determining the physical and mental well-being of users to analyze problems that may contribute to poor health behavior (Taylor-Piliae and collaborators, 2010).

Data collection is essential for the quality and timing of scientific studies and, on studies about physical activity, questionnaires are indispensable to obtain information about user practices (Taylor-Piliae and collaborators, 2010, Van Gelder, Bretveld, Roeleveld, 2010, Jung and collaborators, 2020).

Reliable instruments which assess the nutritional behaviors of fitness center members can help implement planning and decision-making for preventive interventions in this population; however, these instruments are still incipient.

This study thus aimed to develop and validate a questionnaire to assess the lifestyle habits, physical activity, and dietary supplements of gym members.

MATERIALS AND METHODS

This is a cross-sectional methodological study conducted with gym members in Madrid, Spain, from May to July 2019. The Research Ethics Committee of the Universidade de Santa Cruz do Sul (UNISC) approved this study under the document no. 2.020.170 and all participants signed an informed consent form.

Creation and Validation of the Questionnaire's Content and Appearance

To create the questionnaire, an integrative literature review was initially conducted to identify questionnaires about the topic of study, that is, the lifestyle and nutritional behaviors of fitness center members.

The literature review followed five steps: identifying the theme and selection of the research question to prepare the integrative review; establishing inclusion and exclusion criteria for studies in the sample and to search the literature; defining the information to be extracted from the selected studies/categorization of studies; assessing studies included in the integrative review and interpreting the results (Mendes, Silveira, Galvão, 2008).

The bibliometric analysis included articles from the Scientific Electronic Library Online (SciELO), Public Medline, or Publisher Medline (PUBMED), which incorporates the Medical Literature Analysis and Retrieval

System Online (MEDLINE) and Google Scholar databases, for studies published from 2010 to 2018 in Portuguese, English, and/or Spanish. This survey was conducted from January to July 2018. Out of the eight articles initially found, five were excluded for being duplicated in the databases.

The results of the integrative review allowed developing the items to create the questionnaire, considering the criteria of relevance, objectivity, and clarity of the content proposed by Pasquali. Out of the 55 items initially elaborated for the questionnaire, 42 were evaluative.

The questionnaire was created online using the Google Forms platform and written in Spanish. It was divided into three sections: section 1 (sociodemographic variables), with 11 questions; section 2 (items related to health, lifestyle, and physical activities), with 35 items; and section 3 (food supplement use), with seven items.

The answer options were created considering attitudes and frequencies for the activity in the respective items. The instrument requires objective and discursive answers.

After the items of the measuring instrument were designed, the instrument's content was validated by associating abstract concepts with observable and measurable indicators (Pasquali, 2009, Monteiro, Hora, 2014).

The Delphi technique was used to verify the content and appearance validity of the items in two rounds, being considered an important consensus technique to guide adjustments regarding the content and appearance of the items of a questionnaire (Scaparo and collaborators, 2012).

Four select experts, three PhD professors and one master's professor, all with degrees in Nutrition and Physical Education, participated in the study during these stages.

The online questionnaire was sent to the select experts, who were asked to classify the items as (3) concordant, with no need for adjustments or exclusion; (2) concordant, but needs adjustments; and (1) disagrees, should exclude or adjust (Pedroso and collaborators, 2017).

For the appearance validity, the experts observed the content of the items, their clarity and ease of reading, and their adequacy to their respective section (Bellucci, Matsuda, 2012).

The experts could also give suggestions regarding the developed items.

Population and Sample Size

The study scenario was conveniently defined, consisting of three fitness centers in Madrid, Spain. The study included attendees of these centers of both sexes and over 18 years old.

The sample size was estimated based on the requirements for psychometric analysis (Hair and collaborators, 2010), which suggests a ratio of 5:1 to 10:1 (five to ten observations for each item of the instruments to be validated), comprising 207 participants.

The sample was considered adequate based on the 19 pre-selected items for analysis of the construction validity and reliability of the questionnaire.

Data Collection

The directors of the fitness centers selected were first contacted to schedule the dates for the data collection. The busiest hours and days of the week were considered, aiming to recruit as many participants as possible.

Two researchers were responsible for recruiting participants. Those who accepted participating in the research were asked to answer the questionnaire and sign an informed consent form. The link to access the questionnaire was sent to participants by text message or email.

Statistical Analyses

For content and appearance validity analysis, the Content Validity Index (CVI) was used to identify the degree of agreement among experts. This index measures the percentage of experts who agree on certain aspects of the questionnaire and its items. The index ranges from 0 to 1, where the closer to 1, the better the item's performance is according to the judges (Malacarne and collaborators, 2017). The construct validity of the questionnaire was verified by structural validity.

In this step, the factorial structure of the questionnaire was analyzed via exploratory factor analysis (EFA) considering extraction by the method of main components and quartimax rotation to achieve better interpretability of the results and a ≥50% proportion of the explained variance (Hair and collaborators, 2010).

The number of factors was chosen according to selecting factors with eigenvalues above 1. The criteria used to select the items

were factor loads higher than 0.4. The adequacy of the analysis was tested by KMO methods and Bartlett's sphericity test.

The reliability analysis was performed by assessing the questionnaire's internal consistency and temporal reproducibility. For internal consistency, Cronbach's alpha was estimated, considering alpha values >0.6 (moderate) as adequate (Cunha, Neto, Stackfteh, 2016).

Temporal reproducibility, in turn, was assessed using test-retest reliabilities, analyzing the inter-item correlations of the questionnaire with the intraclass correlation coefficients (ICC). In the ICC interpretation, the item retention limit was >0.5, a value considered adequate to certify the temporal reproducibility of a questionnaire (Field, Field, 2009).

To operationalize the test-retest reliability, an interval of 14 days between applications was determined together with participation in both moments (Keszei, Novak and Streiner, 2010).

Twelve participants were randomly selected and contacted via phone and/or email to request their participation in the test-retest stage. All those contacted agreed to participate in this new stage. A new link to the online questionnaire was then sent to them via phone and/or email.

Participants were given three days to complete the questionnaire. Moreover, the questionnaire items were ordered differently than in the first questionnaire to avoid memory bias and increase the reliability of results.

The scores attributed to each item response were considered to define the questionnaire's interpretability and develop its scoring system.

The score achieved by practitioners thus indicates their suitability for lifestyle habits and behaviors. This definition was based on the consensus technique "traditional committee" (Souza, Silva, Hartz, 2005), which involved researchers and specialists on the subject. Data were processed using the SPSS software version 21.0 (IBM Corp., Armonk, NY, USA). Statistical significance was set at $p<0.05$.

RESULTS

In the first round of the Delphi technique, all 42 items were scored 3 (concordant, without needing adjustments or exclusion). In this round, the only changes were suggestions to modify three items to have mandatory answers and to add two more items about physical activities in session 3 of the questionnaire.

After the changes, the questionnaire was sent to the experts again (second round), who approved its final version with 44 items - thus finalizing the content and appearance validation part of the questionnaire. The two rounds presented a CVI of 100% since the judges classified all items as "concordant, without needing adjustments or exclusion".

Since the final questionnaire covered questions with different answer options, its structure could not be analyzed via factor analysis.

Therefore, only the items that could be analyzed using a three-point Likert scale were selected.

Table 1 shows the 19 pre-selected items considered for the construct validity analysis and reliability certification of the questionnaire. The remaining items were not considered for the questionnaire validation.

Table 1 - Items selected for the questionnaire.

Items		Response options	Score
1	Are you satisfied with your weight?	Yes	3
		No, I would like to decrease it	2
		No, I would like to increase it	1
2	How do you rate your health status?	Excellent/Good	3
		Regular	2
		Bad	1
3	How long have you used any medication?	I do not use any	3
		Up to one year	2
		Over one year	1
4	How do you describe the stress level in your life?	Rarely stressed or sometimes stressed	3
		Almost always stressed, frequently facing problems	2

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		Excessively stressed, with difficulties in daily life	1
5	How do you manage the stress level in your life?	Very well or well Precariously With great difficulty	3 2 1
6	Do you smoke?	Yes, I smoke daily/Yes, I smoke, but not daily I do not smoke now, but I have smoked before/I do not smoke, but I live with smokers I do not smoke and I have never smoked	1 2 3
7	If you smoke, how much per day?	I do not smoke Up to two packs More than two packs	3 2 1
8	Do you consume alcoholic beverages?	No Yes, once a week Yes, twice a week or more	3 2 1
9	What is your level of occupational activity?	Sedentary or light Moderate (e.g., cleaning, waitering, or delivering mail on foot or by bicycle) Heavy (e.g. heavy industrial work, construction, or agriculture)	1 2 3
10	Describe your level of physical activity in your free time.	Very light or light Moderate Active or very active	1 2 3
11	How long have you been attending the gym?	<12 months One to three years Over three years	1 2 3
12	How much time a week do you dedicate to this activity?	Once a week Twice a week Three times a week or more	1 2 3
13	And how many minutes per day do you dedicate to this activity?	Up to 60 minutes Between 60 and 120 minutes Over 120 minutes	1 2 3
14	Do you regularly participate in any physical, competitive, recreational, or leisure activities?	No Yes, once to twice a week Yes, three times a week or more	1 2 3
15	How much time do you dedicate to this activity (competitive, recreational, or leisure)?	I do not practice any Up to 60 minutes Over 60 minutes	1 2 3
16	If you are on a diet, how long since you started?	I have not adopted one Up to six months Over six months	3 2 1
17	How do you usually (most often) go to work?	On foot/Bicycle Bus Car/Motorcycle	3 2 1
18	Do you use any kind of dietary supplement?	No Medical/functional/other Sports supplements	3 2 1
19	Why do you use the supplement?	I do not use any Health reasons Aesthetics/mass gain/muscle recovery/performance	3 2 1

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The structural validity of the questionnaire was assessed by EFA in several steps until reaching a satisfactory model. In the initial stage, items with inter-item correlations <0.2 were excluded.

In the remaining stages, commonality and factorial loads were analyzed for an ideal model (commonality <0.5 and factorial load >0.4, in a single factor). In these stages, 11 items (1, 2, 3, 8, 9, 10, 11, 12, 13, 16, and 17) were excluded.

The final model consisted of eight items (4, 5, 6, 7, 14, 15, 18, and 19), being considered adequate according to the Barlett sphericity test (1393.240; p<0.001) and showing correlation among items. The KMO index (0.510) indicated the adequacy of the factor analysis to analyze the correlation matrix.

Table 2 describes the eigenvalues and the variance explained by each factor extracted from the questionnaire.

Four items had an eigenvalue >1, explaining about 88% of the total variance of the set of items.

Table 3 describes the commonality associated with each item. All eight items showed high variability explained by the extracted factors (>0.7), with commonalities ranging from 0.720 to 0.997.

Table 2 - Total variance explained for the items in the final questionnaire.

Items	Initial eigenvalues			Extraction sums of squared loadings			Rotating sums of squared loadings		
	Total	Variance (%)	% Cumulative	Total	Variance (%)	% Cumulative	Total	Variance (%)	% Cumulative
4	2.248	28.096	28.096	2.248	28.096	28.096	1.994	24.925	24.925
5	1.940	24.255	52.351	1.940	24.255	52.351	1.857	23.215	48.140
6	1.580	19.755	72.106	1.580	19.755	72.106	1.703	21.283	69.423
7	1.253	15.666	87.773	1.253	15.666	87.773	1.468	18.350	87.773
14	0.532	6.653	94.425						
15	0.287	3.586	98.011						
18	0.154	1926	99.937						
19	0.005	0.063	100.000						

Extraction method: analysis of the main component.

Table 3 - Communalities of the items in the final questionnaire.

Items		Communalities
4	How do you describe the stress level in your life?	0.720
5	How do you manage the stress level in your life?	0.758
6	Do you smoke?	0.856
7	If you smoke, how much per day?	0.853
14	Do you regularly participate in any physical, competitive, recreational, or leisure activities?	0.922
15	How much time do you dedicate to this activity (competitive, recreational, or leisure)?	0.919
18	Do you use any kind of dietary supplement?	0.997
19	Why do you use the supplement?	0.997

The matrix of the factor loads shows the composition of each factor extracted from the questionnaire.

The highest loads indicated which factor each item was most related to. Factor 1, composed of items 18 and 19 “Do you use any type of dietary supplement?” and “Why do you use the supplement?”, was related to the use of supplementation; factor 2, composed of items 14 and 15 “Do you regularly participate in any

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physical, competitive, recreational, or leisure activities?" and "How much time do you dedicate to this activity (competitive, recreational, or leisure)?", was related to the practice of physical activities for leisure or recreation; factor 3, including items 6 and 7 "Do you smoke?" and "If you smoke, how much per day?", was related to the use of tobacco; and factor 4, composed of items 4 and 5 "How do you describe the stress level in your life?" and "How do you manage the stress level in your life?", was related to stress level (Table 4).

Table 4 - Rotated factorial loads of items associated with factors extracted from the final questionnaire.

Items		Factors			
		1	2	3	4
4	How do you describe the stress level in your life?	0.002	0.167	0.048	0.830[a]
5	How do you manage the stress level in your life?	0.036	-0.007	0.015	0.870[a]
6	Do you smoke?	0.064	-0.064	0.921[b]	-0.018
7	If you smoke, how much per day?	0.049	0.013	0.918[b]	0.085
14	Do you regularly participate in any competitive, recreational, or leisure physical activities?	-0.041	0.955[c]	-0.040	0.085
15	How much time do you dedicate to this activity (competitive, recreational, or leisure)?	-0.058	0.953[c]	-0.013	0.082
18	Do you use any kind of dietary supplement?	0.995[d]	-0.051	0.063	0.018
19	Why do you use the supplement?	0.995[d]	-0.051	0.058	0.025

[a]questions 4 and 5 were associated with factor 4; [b]questions 6 and 7 were associated with factor 3; [c]questions 14 and 15 were associated with factor 2; [d]questions 18 and 19 were associated with factor 1.

The internal consistency was adequate in all factors, being higher for the first two factors (0.997 and 0.916, respectively) and lower but still acceptable for the last two factors (0.698 and 0.631, respectively) (Table 5).

Table 5 - Assessment of the internal consistency of the questionnaire.

Factors	Items	α*	[95%CI]
1	18 19	0.997	[0.996 – 0.998]
2	14 15	0.916	[0.889 – 0.936]
3	6 7	0.698	[0.603 – 0.770]
4	4 5	0.631	[0.515 – 0.719]
α* General [95%CI]		0.545	[0.445 – 0.633]

CI: Confidence interval; *Cronbach's alpha value.

The ICC values of the items confirmed the questionnaire's temporal reproducibility. The ICCs were substantially high in factors 1 (ICC = 0.987; 95%CI = 0.958;0.996), 3 (ICC = 0.921; 95%CI = 0.739;0.978), and 4 (ICC = 0.866; 95%CI = 0.595;0.959), showing a high reproducibility of the test in these factors, and moderate in factor 2 (ICC = 0.542; 95%CI = -0.048; 0.845).

The final version of the questionnaire, reliable and valid, was composed of eight items (4, 5, 6, 7, 14, 15, 18, and 19) divided into four factors (supplementary material).

Although items 1, 2, 3, 8, 9, 10, 11, 12, 13, 16, and 17 were not considered valid or reliable, they were added to the questionnaire as descriptive items to better assess the lifestyle habits, physical activity, and dietary supplementation of fitness center members.

The final version of the questionnaire obtained a score of 24 points, being stratified into 1) 0 to 8 points: practitioners with inadequate lifestyle habits, physical activity, and

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dietary supplementation; 2) 9 to 16 points: requires improvements regarding inappropriate lifestyle habits, physical activity, and dietary supplementation; 3) 17 to 24 points: adequate lifestyle habits, physical activity, and dietary supplementation (supplementary material).

DISCUSSION

The questionnaire developed and validated in this study presented excellent results for the relevance, objectivity, and clarity of the items, which are essential for the content and appearance validity of a measuring instrument (Polit and Yang, 2016).

The literature recommends a cut-off point higher than 75% to obtain consensus when performing the Delphi technique (Pereira and Alvim, 2015).

In the content and appearance validation stage, this study's questionnaire obtained a CVI value of 100% due to the unanimous approval of the items by the experts. Other studies have found similar results at this validation stage (Oliveira and collaborators, 2020).

Regarding the structural validity of the questionnaire, using EFA was significantly effective to verify the latent structure of the studied construct, where a proportion of the explained variance >50% is expected with the extraction of the questionnaire factors (Hair and collaborators, 2010).

Four factors of the questionnaire explained 88% of the variance, ensuring the quality of the EFA adjustment and conformism of the structural validity of the questionnaire.

This finding corroborates the results of studies that used EFA to assess the structural validity of their instruments (Siqueira and collaborators, 2020).

The number of items in each extracted factor was small, generating small alpha values (Tavakol, Dennick, 2011).

This justifies the alpha values of the last two factors and the value of the general alpha. However, the questionnaire was considered internally consistent in all factors extracted, with adequate Cronbach's alpha values and similarly to others found in the literature (Hair and collaborators, 2010, Malacarne and collaborators, 2017, Amaral and collaborators, 2020, Gómez-Carmona, Cervera, Benito, 2014).

Temporal reproducibility is observed when a measuring instrument produces similar results at different times, indicating replicable and stable results (Echevarría-Guanilo, Gonçalves, Romanoski, 2017).

Our questionnaire showed significant correlations for all items between the two moments of application, presenting excellent ICC values and certifying its temporal reproducibility. Other studies have also used the ICC to assess the temporal reproducibility of measurement instruments (Baumann and collaborators, 2017, Zhou and collaborators, 2017).

Regarding the second factor (physical activity for leisure or recreation), however, the ICC value was moderate, indicating that the responses to the items of this factor may have undergone greater variation after the two weeks between the test and the retest.

This interval between the two applications is a critical aspect of the test-retest reliability since small intervals produce memory biases in the second application (retest) (Polit and Yang, 2016), whereas long intervals produce knowledge about the construct evaluated by the instrument (Echevarría-Guanilo, Gonçalves, Romanoski, 2017).

Moreover, the construct must remain similar in both applications (Keszei, Novak, Streiner, 2010).

Nevertheless, the moderate ICC value for the second factor, the time interval, and the guarantee of the immutability of respondents in both moments of the test-retest were as described in the literature, certifying the temporal reproducibility of the questionnaire (Amaral and collaborators, 2020, Echevarría-Guanilo, Gonçalves, Romanoski, 2017).

With internet access worldwide, the virtual environment has been increasingly used as an important resource in improving and speeding up the research process and reducing obstacles concerning time, geographic space, costs, and error rate (Sjetne and collaborators, 2019).

In this sense, the questionnaire's online format has improved its implementation and use, increasing the generation of data.

Concern about the quality of life of individuals has been increasing with the increase in life expectancy (WHO, 2018).

In this sense, exercising in gyms has helped improve levels of health and quality of life besides preventing several diseases, including those related to stress (Sala and collaborators, 2019).

However, literature shows a lack of instruments for assessing the lifestyle habits, physical activity, and dietary supplementation of fitness center members.

Besides exercising in gyms, many individuals have also engaged in leisure-time physical activities in other settings (Zhang, Qing, Zhang, 2021).

Engaging in physical activity during leisure time has been the subject of research in recent decades, being associated with improved cognitive, physical and mental function and positive emotions in individuals (Denovan, Macaskill, 2017).

Some studies have shown that physical exercise is also recommended to reduce and control smoking cravings due to its positive influence on anxiety control (Pérez, 2009).

Moreover, physical exercises can help ex-smokers control their weight and reduce the chances of relapse (Salin and collaborators, 2019, Wai and collaborators, 2018).

Furthermore, the search for healthier behaviors has increased awareness among smokers of needing to adopt a more active lifestyle (Papathanasiou and collaborators, 2012).

Fitness centers are suitable places for individuals with no professional connection to sports to practice physical exercises. However, the gym environment has favored the consumption of dietary supplements (Oliver, León, Hernández, 2011).

Evidence shows that supplement consumption among gym members is associated with changes in body composition (Silva and collaborators, 2020).

Moreover, as the individual is more exposed to the consumption environment, with greater gym attendance, he is more likely to consume these products (Hirschbruch, de Carvalho, 2002, Campbell and collaborators, 2021).

This could lead individuals to consume supplements without the guidance and prescription of a trained professional, allowing the consumption of prohibited substances or an abusive intake and causing health risks (Hirschbruch, de Carvalho, 2002, Campbell and collaborators, 2021).

Reliable instruments apply faithful measures and, when valid, they measure the construct proposed (Echevarría-Guanilo, Gonçalves, Romanoski, 2017).

A reliable and valid questionnaire can therefore assist physical education and health professionals and researchers in supervision, planning, and decision-making about the target audience.

This study is relevant since it offers a validated questionnaire with important items to obtain reliable and valid data on stress level, tobacco consumption, leisure-time physical activity, and dietary supplement consumption.

A limitation of the study was the selection bias, considering that the sample was composed only of fitness center members with available cellphone numbers and email addresses.

CONCLUSION

In conclusion, this study provides a reliable and valid questionnaire to assess stress, smoking, physical activity, and dietary supplementation in gym members.

This questionnaire presents is useful for physical education professionals, health professionals, and researchers to define strategies to improve the quality of life of gym members regarding the validated items.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS

SIRF, PJB, DSS, EAC and PM significantly contributed to the preparation and design of the study.
DSS, GCU performed data collection.
PJB, DSS assisted in data analysis.
PJB, SIRF, DSS, CS, PM, and EAC interpreted the data.
DSS, GCU, CS wrote the article.
Finally, SIRF, PJB, PM, and EAC made a critical review of the content and approved the final version of the manuscript.

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SUPPLEMENTARY MATERIAL

QUESTIONNAIRE TO ASSESS LIFESTYLE HABITS, PHYSICAL ACTIVITY, AND DIETARY SUPPLEMENTATION OF GYM MEMBERS

	ITEMS	SCORE	
	Use of supplementation		
1	Do you use any kind of supplement?	③	No
		②	Medical / functional / other
		①	Sports
2	If yes, why?	③	No use
		②	Health
		①	Aesthetics/mass gain/muscle recovery/performance
	Physical activity practice for leisure or recreation		
3	Do you regularly participate in any competitive, recreational, or leisure physical activities?	①	No
		②	Once to twice a week
		③	Three times a week or more
4	How much time do you dedicate to this activity (competitive, recreational, or leisure)?	①	I do not practice any
		②	Up to 60 minutes
		③	Over 60 minutes
	Tobacco use		
5	Do you smoke?	①	Yes, I smoke daily / I smoke, but not daily
		②	I do not smoke nowadays, but I have smoked before / I do not smoke, but I live with smokers
		③	I do not smoke and have never smoked
6	If you smoke, how much per day?	③	I do not smoke
		②	Up to two packs
		①	More than two packs
	Stress level		
7	How do you describe the level of stress in your life?	③	Rarely stressed or sometimes stressed
		②	Almost always stressed, facing problems frequently
		①	Excessively stressed, with difficulties to face in daily life
8	How do you manage the level of stress in your life?	③	Very well or well
		②	Precariously
		①	With great difficulty

☐ 0-8 = gym members with inappropriate life habits, consumption of food supplements, and behaviors
☐ 9-16 = gym members who require improvements in living habits, consumption of dietary supplements, and behavior
☐ 17-24 = gym members with appropriate living habits, consumption of food supplements, and behavior

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DESCRIPTIVE ITEMS

1	Are you satisfied with your weight?	◯	Yes
		◯	No, I would like to gain weight
		◯	No, I would like to lose weight
2	How do you rate your health status?	◯	Excellent/Good
		◯	Regular
		◯	Bad
3	How long have you been using any medication?	◯	I do not use any
		◯	Up to a year
		◯	Over a year
4	Do you consume alcoholic beverages?	◯	No
		◯	Once a week
		◯	Twice a week or more
5	What is your level of occupational activity?	◯	Sedentary or light
		◯	Moderate (e.g., cleaning, waitering, or delivering mail on foot or by bicycle)
		◯	Heavy (e.g., heavy industrial work, construction, or agriculture)
6	Describe your physical activity in your free time.	◯	Very light or light (almost no activity)
		◯	Moderate (regular activity up to twice a week, e.g., walking, cycling, gardening, or walking to work 10-30 minutes a day).
		◯	Active (regular activities more than three times a week, e.g., intensive hiking, cycling, or other sports) or Very Active (strenuous activities more than four times a week)
7	How long have you been going to the gym?	◯	<12 months
		◯	One to three years
		◯	Over three years
8	How much time a week do you dedicate to this activity?	◯	Once a week
		◯	Twice a week
		◯	Three times a week or more
9	And how many minutes per day do you devote to this activity?	◯	Up to 60 minutes
		◯	Between 60 and 120 minutes
		◯	Over 120 minutes
10	If you are on a diet, how long since you started?	◯	I did not adopt one
		◯	Up to six months
		◯	More than six months
11	How do you usually (most often) go to work?	◯	On foot/Bicycle
		◯	Bus
		◯	Car/Motorcycle

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