Muscle size satisfaction and predisposition for a health harmful practice in bodybuilders and recreational gymnasium users

Rasa Jankauskienė, Kęstutis Kardelis, Simona Pajaujienė[1]
Laboratory of Social Research in Physical Education and Sport,
[1]Department of Combat Sports, Lithuanian Academy of Physical Education, Lithuania

***Key words**: men; body image; muscle gain; bodybuilding; sport mastery.*

***Summary.** The aim of this study was to investigate muscle size satisfaction and predisposition to health harmful muscle gain practice in bodybuilders and recreational gymnasium users and to evaluate its relationship with sport mastery. The sample consisted of 132 men (51 bodybuilders and 81 recreational gymnasium users). The muscle size satisfaction and related variables were evaluated using a 23-item questionnaire (α=0.6, test-retest reliability 0.7). The difference between the actual and the desired girths of the widest site of the upper arm and the thigh was determined based on the subjects' reported data. The study showed that the majority of the gymnasium users (61.2%) wanted to gain muscle mass, but the tendency was observed that muscle size dissatisfaction, preoccupation with body shape, obligatory motivation, and obsessive attitude towards exercising depended on the sport mastery – the lower mastery predicted higher values. Entering bodybuilding competitions was associated with a 3.2-time (95% CI 1.14–9) higher muscle size dissatisfaction and a 4.8-fold increase (95% CI 1.4–16) in reported predisposition for health harmful muscle gain practice; however, being a bodybuilder was associated with 5.7-time (95% CI 1.9–17) higher predisposition for a health harmful practice. In conclusion, bodybuilders have lower muscle size satisfaction and significantly higher predisposition to health harmful muscle gain practice as compared to recreational gymnasium users. Our findings service for understanding that competitive bodybuilders are not body image homogeneous group if their sport mastery is ignored.*

Introduction

Body dissatisfaction is one of the main predictors of body image-related disorders (eating disorders, body dysmorphia, exercise dependence). Dissatisfaction with body image and body image-related disorders are common in the countries with the Western culture or in the countries where this culture has influence (1). Historically, beauty as a virtue was socially required from women, but the recent trend is that men are also required to adapt to the canons of male beauty typical of the Western culture (2, 3). If the female ideal is characterized by soft, juvenile, and gracious appearance, the male one is associated with power, maturity, and aggressiveness (4). Male body in the Western world has been acquiring an increasing commercial value, especially since the 1980s (5).

Studies show that in general males are more satisfied with overall appearance and weight than women (6, 7). Men's aspirations do not coincide: some want to be more sinewy, while others want to loose weight, and this depends on their actual body weight (8). It was also found that men sought for a muscular body since they believe that it is the most attractive to the opposite sex. Studies of sports involved men confirmed that the ideal body weight of men was greater than the present one (3).

According to the findings of recent studies, men's dissatisfaction with their bodies is related to the drive for muscularity. Drive for muscularity reflects attitudes and behaviors that reflect the degree of people's preoccupation with increasing their muscularity (9). Studies showed that dissatisfaction with one's musculature in boys occurs already in childhood and adolescence (8). A mass media, particularly health and fitness magazines, reinforces the drive for muscularity (10). Dissatisfaction with one's body shape is sometimes accompanied by the drive for a mesomorphic body type or a syndrome called the *Adonis complex* (4, 11). Recent studies have showed that men more and more frequently suffer from body image-related disorders

Correspondence to R. Jankauskienė, Laboratory of Social Research in Physical Education and Sport, Lithuanian Academy of Physical Education, Sporto 6, 44221 Kaunas, Lithuania. E-mail: r.jankauskiene@lkka.com

such as eating disorders, body dysmorphia, and exercise dependence (4, 9, 12, 13).

The epidemiological prevalence of the usage of so-called body image drugs as anabolic steroids and other non-prescription pharmaceuticals for muscle gain was observed in general population with the highest prevalence in gymnasium users, especially in weight lifters and bodybuilders (14–21).

Bodybuilding as an activity falls between sport, entertainment, and physical activity (22). Competitions are judged solely on physical appearance and posing ability. The major aim is to develop an overall symmetrical physique that exhibits muscle size and definition. The body image of bodybuilders is in the focus of researchers because it was found that bodybuilders suffer from distorted body image (23), exercise dependence (24), and their psychological characteristics are similar to those of women with anorexia nervosa (25). The findings are contradictory: some of them show that bodybuilders are more "body and muscular dysmorphic" (23, 26), while other demonstrate opposite (27). The drive for muscularity and dissatisfaction with muscle size is related to the higher predisposition to health harmful practice such as the use of drugs, obsessive exercising, dysfunctional eating and with the lower quality of life as an outcome (3, 12).

The aforementioned facts show that the studies on gymnasium subculture are relevant, especially having in mind the increasing number of boys striving for the masculine body image and those who started bodybuilding. In the present study, we wanted to assess bodybuilders' satisfaction with their own muscle size and other body image-related behavior and to find out factors that may possibly lead to higher predisposition to a health risk behavior. Modern bodybuilders of international mastery have enormous muscle size, and the great difference exists between muscle size of the novice and advanced bodybuilders. So, sports mastery was chosen as an independent variable in the present study. We made an assumption that the majority of gymnasium users would want to gain more muscle mass, while muscle size dissatisfaction and predisposition to health risk behavior would be more common in bodybuilders and would depend on the level of sports mastery: the lower mastery would predict higher muscle size dissatisfaction and health risk behavior in bodybuilders. The aim of the study was to assess muscle size satisfaction and predisposition to health risk behavior in gymnasium users and to evaluate its dependence on sports mastery in bodybuilders.

Methods

A survey was carried out during two Lithuanian national championships of bodybuilding with the permission of organizers. The questionnaires were filled in by bodybuilders who participated in the competitions at that time, as well as by those who observed the competitions as spectators. The questionnaires were filled in during the break after semifinals.

Recreational gymnasium users were randomly selected from nine bodybuilding, sports, and wellness clubs of Kaunas (the second largest city of Lithuania). The survey was performed on the benevolence, ethical, and legal principles of studies and with the permission of the managers of the clubs. The procedure of the questionnaire filling was performed after the individual workouts, with the participation of one of the researchers; the questionnaires were collected immediately after the filling. The subjects were given as much time as they needed, but the questionnaires were completed in 20–25 minutes. All men who participated in the study were informed about the aim of the study, the anonymity of the data and were familiarized with the instructions on filling the questionnaire. They were asked to answer the questions honestly and independently. Incompletely or inaccurately filled questionnaires were excluded (the number of such questionnaires was 11), thus the data used for this study were collected from 121 men (48 bodybuilders and 73 men involved in weight training activity).

Subjects. The sample consisted of 132 men: 51 bodybuilders of various sport mastery who at least once participated in bodybuilding competition and 81 recreational gymnasium users who did not participate in any competitions. The mean age of the studied sample was 25.6±7.1 years. There was no difference in the mean age between bodybuilders and recreational gymnasium users (25.06±6.85 and 26.00±7.29 years, respectively; $F=0.5$, $P=0.48$). Their education levels did not differ either ($\chi^2=2.81$; $df=2$; $P=0.245$) (Table 1). The sample represents the Lithuanian population of amateur bodybuilders (the calculated number of the cases of the sample of bodybuilders at 5% reliability and 95% reliability was 44.6). The studied bodybuilders were divided into two groups. Those who at least once participated in city- or national-level competitions were assigned to the low-mastery bodybuilding group, and the participants of international competitions – to the high-mastery bodybuilding group.

Questionnaire. The attitude of the studied bodybuilders and recreational gymnasium users towards their musculature and exercising was evaluated using a self-designed questionnaire consisting of 23 items. Subjects reported age, educational level, family status, frequency and experience of exercising, sports mas-

Table 1. **The distribution of the subjects according to age, education level, family status, and sports mastery**

Variable	Bodybuilders		Gymnasium users	
	n	%	n	%
Age				
Up to 30 years	36	75	51	69.9
More than 30 years	12	25	22	30.1
Education level				
Secondary	23	47.9	24	32.9
Unfinished higher	11	22.9	23	31.5
Higher	14	29.2	26	35.6
Family status				
Single/divorced	33	68.7	53	72.6
Married	15	31.3	20	27.4
Sports mastery				
Gymnasium users			73	100
Low-mastery bodybuilders	33	68.7		
High-mastery bodybuilders	15	31.3		

tery, satisfaction with one's muscle size, body weight satisfaction; obligatory motivation to exercise; preoccupation with body shape; and predisposition to a health harmful practice in order to gain muscle mass. The difference between the actual and the desired muscle size (at the widest site of the upper arm and the thigh) was determined based on upper arm and thigh girths in centimeters reported by subjects. The subjects were asked to report the circumferences of their right upper arm and thigh in centimeters when the muscles were relaxed. In the previous study, we had found that the coincidence of such data in bodybuilders was reliable – the test of Kolmogorov-Smirnov showed that test distribution was normal; mean ± SE for the upper arm was 0.4±0.27; CI [–0.16; 0.96], for the thigh it was 1.85±1.03; CI [–0.31; 4.01]. The coincidence of data in recreational gymnasium users was reliable only for the upper arm: 2.27±1.4; CI [–0.7; 5.24], while for the thigh it was 4.67±1.9; CI [0.58; 8.76]. Internal consistency of the questionnaire was satisfactory (Cronbach alpha was 0.6). Test-retest reliability was 0.7 after a two-week interval of retesting.

Statistical analysis. Statistical analysis of the study was performed using SPSS 11.0 software package for Windows. The statistical relationship between the qualitative characteristics was evaluated using χ^2 criterion. The results were considered statistically significant if the value of the probability of deviation was $P<0.05$ at 95% confidence interval (CI). Multivariate logistic analysis was used to estimate the dependence of variables that can cause the drive for muscular dissatisfaction and related health risk behavior on other study variables. Correlation between the dependant and independent variables was analyzed calculating the odds ratio (OR) and its 95% confidence interval. OR was regarded statistically significant if the confidence interval did not exceed 1.

Results

The distribution of the subjects according to age, education level, family status, sports mastery is presented in Table 1.

The majority (63.6%) of the gymnasium users considered their weight to be normal, but 25.6% of the subjects thought that their weight was too low, and 10.8% evaluated their weight as too high. More bodybuilders thought that their weight was too low, while more recreational gymnasium users thought that their weight was too high (Fig.).

The majority of the sample reported that they were not satisfied with the current muscle size (61.2%) while the highest dissatisfaction was observed in city-level bodybuilders (Table 2). This group reported significantly higher muscle mass dissatisfaction, feelings of fear if missing workout, and predisposition to a health harmful muscle gain practice (Table 2).

The girths of upper arms and thighs in national and international mastery bodybuilders were greater than those in city-level bodybuilders (Table 3). However, the desired circumferences were greater than the actual ones in all cases. The reported girths desired by recreational gymnasium users were lower than those

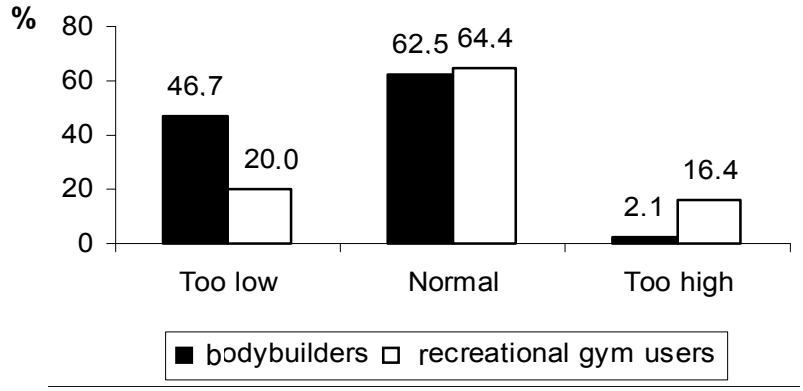

Fig. **The evaluation of body weight in bodybuilders and gymnasium users**
χ^2=8.5; df=2; P<0.05.

Table 2. **The distribution of the gymnasium users of different sport mastery according to dependent variables of the study**

Sport mastery	Reported muscle mass dissatisfaction (%)	Reported anxiety if losing muscle mass (%)	Preoccupation with body shape (%)	The concern with body shape enforces to exercise (%)	Weight training despite cold, flu or injure (%)	Always feel fear and anxiety if missing workout (%)	Reported predisposition for health harmful muscle gain practice (%)
Recreational gymnasium users	53.4	28.8	20.5	38.4	60.3	8.2	8.2
Participants of city-level bodybuilding contests	87.5	50	50	100	62.5	37.5	50
Participants of national-level bodybuilding contests	76	24	28	56	72	20	28
Participants of international bodybuilding contests	60	20	26.7	33	46.7	26.7	40
	χ^2=6.5; df=3; P<0.05	χ^2=3.5; df=6; P=0.82	χ^2=3.5; df=3; P=0.3	χ^2=20.7; df=6; P=0.23	χ^2=2.59; df=3; P=0.46	χ^2=13.9; df=6; P<0.05	χ^2=16.1; df=3; P<0.01

desired by bodybuilders, but the difference between the actual and desired circumferences was nearly equal as in bodybuilders of national and international level. The highest difference was observed in the bodybuilders of the city level.

The age up to 30 years predicted the highest dissatisfaction with one's muscle size (Table 4). Younger recreational gymnasium users (up to 30 years) reported 6.5-time greater dissatisfaction with their muscle size as compared to subjects aged more than 30 years (95% CI 1.96–21.35). A tendency was observed that they also more frequently admitted that they felt fear when their muscle mass decreased and were preoccupied with the body shape. Meanwhile, the bodybuilders' age was not associated with dissatisfaction with one's musculature or preoccupation with body shape, only

Table 3. **Mean values of actual and desired girths of upper arm and thigh in bodybuilders and recreational gymnasium users (SD)**

Sport mastery	The actual and the desired girths of upper arms and thighs (cm)					
	Actual girth of upper arm	Desired girth of upper arm	Difference between actual and desired girths	Actual girth of thigh	Desired girth of thigh	Difference between actual and desired girths
Recreational gymnasium users	38.9 (5.36)	44.6 (5.02)	5.7	58.09 (8.37)	64.0 (8.71)	5.91
Participants of city-level bodybuilding contests	41.1 (4.08)	51 (5.48)	9.9	64.6 (5.03)	76.0 (5.6)	11.4
Participants of national-level bodybuilding contests	42.36 (1.93)	47.6 (3.12)	5.2	62 (6.1)	68.0 (5.34)	6
Participants of international bodybuilding contests	45.5 (3.6)	51.1 (5.11)	5.6	66.36 (4.14)	74.14 (7.95)	7.78
	F=9.6; P=0.001	F=6.8; P=0.001		F=5.2; P=0.002	F=4.5; P=0.006	

SD – standard deviation of mean values.

Table 4. **Odds ratio of factors influencing muscular dissatisfaction, its related emotions and risk behavior by the study group variables**

Variable	Muscular dissatisfaction		Fear due to decreased musculature		Preoccupation with body shape		Weight training despite illness		Usage of health harmful measures for muscular gain	
	Recreational gym users	Bodybuilders	Recreational gym users	Bodybuilders	Recreational gym users	Bodybuilders	Recreational gym users	Bodybuilders	Recreational gym users	Bodybuilders
Age										
<30 years	6.5**	0.3	1.4	8	1.5	0.9	0.9	0.8	2	0.6
≥30 years	1	1	1	1	1	1	1	1	1	1
Education level										
Higher	1	1	1	1	1	1	1	1	1	1
Secondary and unfinished higher	0.95	0.3	1.6	1.2	13*	2.6	0.4	6*	0.6	3
Family status										
Married	1	1	1	1	1	1	1	1	1	1
Single	4.8*	3.5	0.5	2.1	1	0.6	1.9	0.5	0.8	0.2*

*P<0.05; **P<0.005.

younger bodybuilders by as much as 8 times more often admitted that they felt fear if their muscle mass decreased (95% CI 0.84–80.5). A tendency was observed that recreational gymnasium users up to 30 years of age twice as often reported predisposition of a health harmful muscle gain practice (95% CI 0.16–24.6) as compared to gymnasium users aged more than 30 years.

Fear and anxiety to lose muscle mass was more frequently expressed by less educated recreational gymnasium users. Lower level of education also determined a 13-fold greater preoccupation with body shape among the recreational gymnasium users (95% CI 1.35–128.4). The same tendency was noticed among bodybuilders (95% CI 0.3–23.7). Lower education levels among bodybuilders significantly predicted an obsessive approach to exercise (it was 6 times higher in less educated bodybuilders) (95% CI 1.2–30.8). A tendency was found that lower education levels predicted 3 times more often reported predisposition of a health harmful muscle gain practice (95% CI 0.6–15).

Single (or divorced) recreational gymnasium users reported nearly a 5-time lower muscle size satisfaction to compare married men (95% CI 1.4–15.9). This tendency was observed among bodybuilders as well – single (or divorced) men nearly 4 times more often admitted that they were dissatisfied with their muscle size compared to the married ones (95% CI 0.6–21.2); however, they did not report higher exercising in spite of flu, cold, or injury or higher disposition to the health harmful muscle gain practice. A tendency was found that single recreational gymnasium users nearly twice as often reported that they exercised despite cold, flu, or injuries compared to the married ones (95% CI 0.6–6.5).

A tendency was found that being a bodybuilder, despite sport mastery, compared to being just common recreational gymnasium user, predicted lower muscle size satisfaction, preoccupation with body shape, feelings of fear and anxiety when missing workout, and nearly 6-time higher predisposition for a health harmful muscle gain practice (Table 5).

In addition to that, the comparison of low mastery bodybuilders and recreational gymnasium users showed that being a low mastery bodybuilder was associated with a 3-time higher muscle size dissatisfaction and nearly 5-time higher predisposition for a health harmful muscle gain practice.

Discussion

The aim of this study was to assess muscle size satisfaction and predisposition to health risk behavior in gymnasium users and to evaluate its dependence on sports mastery. It is known that the desired muscle size in men are greater than the actual (3); our findings support general belief that majority of gymnasium users want to gain muscle mass. Though bodybuilders' reported actual girths of upper arm and thigh were higher as compared to recreational gymnasium users, the difference between actual and desired cir-

Table 5. **Logistic regression of muscular dissatisfaction, other dependent variables, and health risk behavior with respect to groups of gym users, bodybuilders, and low-mastery bodybuilders**

	Muscle size dissatisfaction	Reported anxiety if losing muscle mass	Preoccupation with body shape	Weight training despite of cold, flu or injury	Fear and anxiety if missing workout (%)	Predisposition for health harmful muscle gain practice
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Recreational gymnasium using	1	1	1	1	1	1
Bodybuilding	2.25 (0.93–5.4)	0.4 (0.1–1.2)	1.5 (0.5–4.2)	0.9 (0.37–2.2)	2.8 (0.8–10)	5.7* (1.9–17)
Low-mastery bodybuilding	3.2* (1.14–9)	0.5 (0.2–1.6)	1.3 (0.4–4.2)	1.3 (0.5–3.5)	2.2 (0.6–8.5)	4.8* (1.4–16)

aOR – adjusted odds ratio; *P<0.005.

cumferences was nearly equal in all gymnasium users. Yet, our study adds evidence that muscle size satisfaction in bodybuilders depends on their sport mastery: the lowest mastery predicts higher dissatisfaction. It could be explained by fact that the big difference exists between muscle size of novice and advanced bodybuilders, while muscle size is the main clue for the success in bodybuilding competitions, so perceived lack of muscularity may predict higher muscle dissatisfaction. Our findings may service for understanding that competitive bodybuilders are not body image homogeneous group if their mastery is ignored.

The tendency was observed that bodybuilders of low mastery (beginners) demonstrated the higher preoccupation with body shape, obsessive attitude towards exercising, anxiety if missing workout and the highest predisposition to health harmful practice. They demonstrated the highest difference between the actual and the desired circumferences of upper arm and thigh. Entering bodybuilding competitions was associated with a 4.8-fold increase in the risk of acceptance of health risk behavior.

The findings may be useful for practitioners who supervise novice bodybuilders when they start to compete and do not have strong recognition yet. This research demonstrates that bodybuilders, especially of low mastery, may be considered an increased health risk group, so an educational influence should be provided by coaches and health care workers to help them to understand the outcomes of bodybuilding common health risk behavior (non-prescription substance use and obsessive exercising).

Our findings partially concur with those presented by Brower *et al.* (1994) who found that muscle size dissatisfaction was associated with the usage of anabolic steroids, and the increase in the number of cases of participation in competitive bodybuilding in the studied sample was associated with an increased risk for the usage of anabolic steroids (28).

Younger age, lower levels of education and, living alone were related to lower muscle size satisfaction, but the influence of these factors in the samples of bodybuilders and recreational gymnasium users differed. The findings confirmed that younger recreational gymnasium users by as much as 6.5 times more often admitted that their muscle size did not satisfy them and more frequently that they are predisposed for the health harmful muscle gain practice. Lower education level in the sample of recreational gymnasium users conditioned a 13-fold higher preoccupation with body shape, but was not associated with health risk behavior (training despite of flu, cold, or injury or predisposition for health harmful practice). Meanwhile, the importance of education among bodybuilders was more prominent – lower levels of education predicted the tendency of higher preoccupation with body shape and higher predisposition for health harmful muscle gain practice. These findings coincide to the results of the study of Porcerelli *et al.* in 1995 (29), where it was found that higher education levels were associated with lower usage of steroids among bodybuilders. Our findings partially coincide with the study by Smith and Halle (2005) where it was found that participants not involved in romantic relationship were more bodybuilding dependent.

The limitation of the study is that the time of the study of bodybuilders was not taken into consideration – the bodybuilders' muscle size and general body satisfaction may differ significantly during different stages of preparation for competitions. It is known that some of bodybuilders gain not only muscular, but also fat mass during the inter-competition period. We thus assume that subjects may exhibit significant higher body and muscle mass dissatisfaction during the period of preparation to contest since the decrease in the adipose tissue during the preparatory period entails the loss of muscle mass as well (30). This important competition-related circumstance should be taken into consideration in further bodybuilders' body image related studies.

Other limitation of the study is that the actual body weight of the sample was not reported thus we could not determine their body mass index, and hence it is difficult to judge the adequacy of the subjects' body mass evaluation. On the other hand body mass index is not a sufficiently informative indicator either concerning the adequacy of the evaluation of one's body weight, since it does not reflect body composition, and thus body mass index may be higher due to higher muscle mass. We think that further studies should better rely on gymnasium users' body composition as in the study by Pickett *et al.*, 2005.

Conclusions

The majority (61.2%) of all gymnasium users reported that they were not satisfied with their current muscle size. Bodybuilders' reported girths of upper arm and thigh were higher as compared to recreational gymnasium users, but the difference between actual and desired girths was nearly equal. Only bodybuilders of low mastery reported significant muscle size dissatisfaction, and the tendency was obser-

ved that low mastery predicted preoccupation with body shape, obligatory motivation to exercise, and obsessive attitude towards exercising. Low-mastery bodybuilding significantly predicted predisposition for the health harmful muscle gain practice while being a bodybuilder predicted even higher predisposition. While the tendency was found that bodybuilders reported more muscle dissatisfaction as compared to gymnasium users, significant differences were found only between bodybuilders of low mastery and recreational gym users. Bodybuilders are not body image homogeneous group if their sport mastery is ignored

Kultūristų ir laisvalaikiu jėgą lavinančių sportuotojų pasitenkinimas savo raumenų apimtimis bei polinkis į sveikatai žalingą elgseną

Rasa Jankauskienė, Kęstutis Kardelis, Simona Pajaujienė[1]
Lietuvos kūno kultūros akademijos Kūno kultūros ir socialinių tyrimų laboratorija,
[1]Dvikovos sporto šakų katedra

Raktiniai žodžiai: vyrai, kūno išvaizda, raumenų apimtys, kultūrizmas, sportinis meistriškumas.

Santrauka. *Tyrimo tikslas.* Nustatyti kultūristų ir laisvalaikiu jėgą lavinančių sportuotojų raumeningumo siekį bei su juo susijusį polinkį į sveikatai žalingą elgseną amžiaus ir sportinio meistriškumo aspektu. Tiriamąją imtį sudarė 132 vyrai, iš kurių 51 – bent kartą dalyvavęs įvairaus meistriškumo varžybose, 81 – laisvalaikiu treniruoklių salėse sportuojantys vyrai, kurie varžybose nedalyvavo. Tyrimui buvo naudojamas 23 punktų klausimynas. Jo vidinis logiškumas buvo patenkinamas (Cronbach alpha – 0,6). Pakartotinio testavimo rezultatai po dviejų savaičių rodė patenkinamą duomenų sutapimą (0,7). Skirtumai tarp esamų ir siektinų kūno apimčių nustatyti pagal respondentų žasto ir šlaunies apimtis (cm). Dauguma tiriamųjų (61,2 proc.) siekė didesnių apimčių, tačiau pastebėta tendencija, kad nepasitenkinimas savo raumenynu ir savo kūno sureikšminimas, motyvacija mankštintis dėl kūno apimčių priklausė nuo kultūristų sportinio meistriškumo: mažesnis meistriškumas prognozavo didesnius rodiklius. Pradėjusiems dalyvauti kultūrizmo varžybose nepasitenkinimas savo raumenų apimtimis išauga 3,2 karto (95 proc. PI: 1,14–9) ir 4,8 karto išauga rizika imtis sveikatai žalingų priemonių siekiant didesnės raumenų masės (95 proc. PI: 1,4–16). Aukštas sportinis meistriškumas prognozuoja 2,3 karto didesnį nepasitenkinimą savo raumenų apimtimis (95 proc. PI: 0,93–5,4) ir 5,7 kartus didesnį polinkį imtis sveikatai žalingų priemonių siekiant raumenų masės (95 proc. CI: 0,93–5,4) palyginus su rekreacinio sporto atstovais, lavinančiais jėgą. Apibendrinus galima teigti, kad kultūristai yra labiau nepatenkinti savo raumenų apimtimis, taip pat yra labiau linkę imtis sveikatai žalingų priemonių, siekdami raumenų masės, palyginus su rekreacinio sporto atstovais, lavinančiais jėgą. Tai ypač būdinga mažesnio sportinio meistriškumo kultūristams. Taigi kultūristai negali būti laikomi homogenišką kūno išvaizdą turinčia imtimi, jei nenustatomas jų sportinis meistriškumas.

Adresas susirašinėti: R. Jankauskienė, LKKA Kūno kultūros ir socialinių tyrimų laboratorija, Sporto 6, 44221 Kaunas
El. paštas: r.jankauskiene@lkka.com

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