Research Article

The Effect of Muscle Dysmorphia and Social Physique Anxiety on the Use of Supplements and Drugs

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Abstract

Background: The use of dietary supplements and drugs to improve performance and physical appearance has recently increased among professional and recreational athletes. Literature shows that bodybuilders, more than other athletes use supplements and drugs.
Objectives: This study aims to predict the use of supplements and drugs by muscle dysmorphia and social physique anxiety variables among Hamedan bodybuilders.
Methods: This cross-sectional investigation was conducted with 438 bodybuilders in Hamedan province. For collecting data, we used a demographic questionnaire, muscle dysmorphia scale, and social physique anxiety scale.
Results: The results showed that 79.2% of the subjects used supplements, and vitamins (22.1%) and protein powders (21.9%) had the highest rates of use among supplements. Moreover, 145 subjects (33.1%) used drugs, and steroid derivatives (16.2%) and peptide hormones and growth factors (12.6%) had the highest rates of use among drugs. The results of t-test showed that muscle dysmorphia and social physique anxiety were significantly higher in the subjects who used supplements and drugs than those who did not. Additionally, the results of logistic regression indicated that muscle dysmorphia and social physique anxiety can predict the likelihood of drug abuse.
Conclusions: The present study provides novel findings of the effect of social physique anxiety and muscle dysmorphia on nutritional supplement and drugs use among bodybuilders.

Keywords: Anabolic Steroids, Sports Supplement, Muscle Dysmorphia, Social Physique Anxiety

1. Background

Currently, the use of dietary supplements and drugs to improve the physical appearance and performance has been increasing among professional and recreational athletes [1]. According to the literature, most dietary supplements that are used include creatine, amino acids, protein powders, vitamins, and minerals [2, 3]. Additionally, it shows that the abuse of drugs such as steroids, peptide hormones, and growth factors has been increasing [4, 5].

Abuse of supplements and drugs is a serious problem in public health [6, 7]. Based on research conducted, the prevalence of drug and supplements abuse is reported to be between 5% - 31% [8-10]. Piacentino et al. [1] reported enhancing performance and reducing problems related to body image as the main drivers of drug abuse. Moreover, studies have shown that users of drugs are often exposed to symptoms of psychiatric disorders, eating disorders, mood disorders, schizophrenia, and muscle dysmor-phic disorder [3, 11].

One of the main factors in predicting drug abuse is body dysmorphic disorder, particularly the muscle dysmorphia [12]. Muscle dysmorphia is a sub-group in body dysmorphic disorders. It has been defined as obsession with physical appearance despite having a good appearance [12, 13]. The prevalence of this disorder is not clear and studies have shown the prevalence of this disorder to be 10% - 53% [13, 14].

Those who feel that their muscles are deformed are concerned about having a muscular body with less fat and are obsessed with exercise and nutrition and use dietary supplements and drugs to have a muscular body [4, 12]. Michelle et al. in a study, showed that bodybuilders have symptoms of muscle dysmorphia more than other resistance athletes; generally, bodybuilders are at a greater risk than non-bodybuilders and non-athletic ordinary people for the symptoms of muscle dysmorphia [11, 15].

Studies have also reported that psychological charac-

teristics such as anxiety, depression, neurosis, and perfectionism have a positive relationship with muscle dysmorphia and that there is a negative relationship between self-esteem and muscle dysmorphia [11, 14, 16]. Similarly, social physique anxiety is a risk factor influential in supplement and drug abuse [3, 17]. Social physique anxiety is a type of anxiety that refers to worries and negative perceptions about one's appearance (body) based on others' evaluation [18]. Hildebrandt et al. showed that disorders related to body image are common among supplement users [19]. It seems that people with higher levels of physical anxiety tend to have behaviors that reduce negative evaluations of their physical appearance.

There are different theories on health and drug abuse; for instance, the theory of planned behavior [20] and theory of triadic influence [21]. The theory of triadic influence categorizes determinants of substance use into intrapersonal, interpersonal-social, and social-cultural factors as streams of influence. These streams are also influenced by three levels of causes, including ultimate, distal, and proximal [21]. Finally, this paper will study the effects of variables of muscle dysmorphia and social physique anxiety variables as behavior regulators at distal and proximal levels on supplement and drug abuse.

2. Objectives

Abuse of drugs and supplements has long been a question of great interest in a wide range of fields. Based on literature, prevalence of use of drugs and supplements in bodybuilders increased and abuse of drug has irreparable consequences on the health of athletes. However, Previous studies of drugs abuse have not deal with Individual risk factors (such as psychological aspects). Accordingly, The purpose of this study was to survey the effects of muscle dysmorphia and social physique anxiety on supplementation and drug abuse in bodybuilders from the Hamedan province. We hypothesized that both muscle dysmorphia and social physique anxiety would predict supplement and drug abuse.

3. Methods

3.1. Sample

This study used a descriptive survey and the cross-sectional method. The sample consisted of all bodybuilders in Hamedan. Sampling was done using the multistage cluster method. In measuring the sample size, the formula for the least size was used to compare the constant ratio in the community and the constant number. For sampling Based on the following formula should take several

components into account: first type of error (α), proportion (p) and the acceptable error (d).

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P (1 - P)}{d^2} \qquad (1)$$

We also used type I error probability α = 0.05 P = 0.28 based on previous research [5] and d = 0.05, calculating the sample size to be 309 persons. In order to, reducing sampling errors, 50% of the sample size calculated and was added to the sample size. So, final total sample size was considered as 464 subjects. First, four cities in Hamedan province were randomly selected (Hamedan, Malayer, Toyserkan, and Asadabad); then, six bodybuilding clubs from each city were randomly selected, and twenty bodybuilders from each club were randomly selected to answer the questionnaire. Lastly, 467 completed questionnaires were collected by researchers. Twenty-nine questionnaires were excluded after the initial check Because of; some questions in the questionnaire were not completed. And in conclusion 438 questionnaires were analyzed. The inclusion criteria were that all the participants should have had at least six months of exercise training on an ongoing basis, and exercise three sessions a week, and be 18 - 38 years old.

3.2. Tools

To collect data, were used a demographic questionnaire, muscle dysmorphia inventory, and social physique anxiety scale. The demographic questionnaire included information on age, education, occupation, exercise history, income, use of supplements, type of supplements used, use of drugs, and type of drug used.

Muscle dysmorphia disorder inventory (MDDI): we assessed muscle dysmorphia using Hildebrandt muscle dysmorphia inventory [19]. This questionnaire consists of 13 items that are scored on a 5-point Likert scale. The validity and reliability of this questionnaire has been reported by Hildebrandt et al. as 0.81. In this study, Waltz and Basel (1983) method was used to check the content validity index (CVI). After verifying translation accuracy, twelve experts (psychology 8, sports psychology 1 and motor behavior 3) determine "relevance", "clarity" and "simplicity" of each item based on a four-point Likert. The content validity index for all questionnaires was calculating 0.86. it also contents validity ratio for this instrument 0.73 obtained. Furthermore, reliability was calculated using Cronbach's alpha and was found to be 0.76.

Social physique anxiety scale: This scale has been proposed by Hart et al. [22] in order to evaluate people's anxiety when others evaluate their bodies. It consists of 12 items. The internal consistency and test-retest reliability of this scale were reported to be 0.9 and 0.82 respectively [22].

The responses are organized based on a 5-point scale and the scores range from 12 to 60. The reliability of this scale has been studied in Iran and the internal consistency has been reported as 0.81 for the total score [23]. In this study, the internal reliability using Cronbach's alpha was found to be 0.86.

3.3. Statistical Analysis

The data were analyzed using SPSS software (version 23). Logistic regression and independent t-test were used to study the objectives of this research. Alpha was considered as lees than 0.05.

4. Results

The results indicated that 347 (79.2 %) subjects (out of 438) used sports supplements, among whom 69 (15.8 %) used protein powders, 96 (21.9%) used vitamins, 97 (22.1) used creatine, 64 (14.6 %) used amino acids, 21 (4.8%) used other supplements, and 91 (20.8%) used no supplements. Furthermore, 293 (66.9%) people used no drugs. Of the 145 (33.15) people who used drugs, 71 (16.2%) used steroid products, 55 (12.6%) used peptide hormones and growth factors, and 19 (4.3%) used other drugs. Table 1 shows that there are statistically significant differences between supplement use and non-use in bodybuilders in those with muscle dysmorphia ($t(436) = 13.48$, $P < .001$) and social physique anxiety ($t(358) = 3.69$, $P < .001$) scores. Furthermore, the difference between drug use and non-use in those with muscle dysmorphia ($t(396) = 8.05$, $P < .001$) and social physique anxiety ($t(181.8) = 8.12$, $P < .001$) was statistically significant (Table 1).

To examine the research hypothesis, a logistic regression was performed to ascertain the effects of muscle dysmorphia and social physique anxiety on the participants' likely use of supplements. When both MDD and SPA enter The logistic regression model was statistically significant, $\chi^2(1) = 150.07$, $P < 0.0001$. The overall model explained 45.0% (Nagelkerke R^2) of the variance in supplement use and correctly classified 88.4% of cases. As well as, result show that model was statistically significant, when MDD as predictor $\chi^2(1) = 146.09$, $P < 0.0001$. The model explained 44.0% (Nagelkerke R^2) of the variance in supplement use and correctly classified 89.5% of cases.

Moreover, the overall logistic regression model was statistically significant for the effect of muscle dysmorphia and social physique anxiety on the probability of drug use in bodybuilders, $\chi^2(1) = 130.72$, $P < 0.001$. The model explained 35.0% (Nagelkerke R^2) of the variance in drug use. Also, prediction model whit SPA was statistically significant $\chi^2(1) = 80.37$, $P < 0.0001$, and 23.0% (Nagelkerke R^2) of the variance in drugs was explain. In addition, SPA alone able to correctly classified 82.0% of cases that use drugs. Additionally, result show that regression model was statistically significant, when MDD as predictor $\chi^2(1) = 48.20$, $P < .0001$. MDD explained 14.0% (Nagelkerke R^2) of the variance in drugs use and correctly classified 82.0% of cases (Tables 2 and 3).

5. Discussion

This paper aimed at studying the effects of muscle dysmorphia and social physique anxiety on using supplements and drugs. The results showed that muscle dysmorphia in the bodybuilders who used supplements and drugs was more than those who did not. Additionally, the logistic regression results showed that muscle dysmorphia can predict the likelihood of use of supplements and drugs by bodybuilders. These findings are in line with results of Babusa and Tury [14], Olivardia et al. [24], and Cella et al. [11]. Literature shows the relationship between muscle dysmorphia and high levels of anxiety [25], depression [16], and low self-esteem [14]. In this context, the results of this study suggest that anxiety and depression may increase muscle dysmorphia. Moreover, bodybuilders with muscle dysmorphia attempt to improve their perceptions of deformity by using supplements and drugs. The results of the present study indicated that social physique anxiety is higher in the bodybuilders who use supplements and drugs than those who do not, and social physique anxiety can predict the use of drugs and supplements. These results support the results of Thomas et al. [18] who revealed that there is a significant relationship between social physique anxiety and muscle dysmorphia and using supplements. In the line with the results of this study, Tsochas et al. [17] showed that social physique anxiety can predict supplement abuse.

According to the theory of triadic influence , behaviors form three levels of causes, including ultimate, distal, and proximal. At the distal level, one of the effective variables is self-confidence. Studies on the relationship between muscle dysmorphia and psychological factors reported a negative relationship between muscle dysmorphia and self-confidence and a positive relationship between muscle dysmorphia and anxiety and depression [14, 16, 25]. Hence, at a distal level, intrapersonal factors such as reduced self-confidence are associated with increased muscle dysmorphia in bodybuilders. Therefore, it seems that this cycle of increased muscle dysmorphia may drive athletes to use supplements and drugs. Moreover, at a distal level, cognitive factors such as expectations and evaluations are effective on behaviors. In this context, it seems

Table 1. Results of t-Tests at MDDI and SPAS in Use and Non-Use Drug and Supplement[a]

			M ± SD	Mean Difference	t	P Value	95% CI for Mean Difference
MDDI	Supplement	Use	30.57 ± 5.22	8.53	13.48	0.0001	7.29 - 9.77
		None-use	22.04 ± 5.92				
	Drugs	Use	31.72 ± 4.51	4.36	8.05	0.001	3.29 - 5.42
		None-use	27.36 ± 6.68				
SPAS	Supplement	Use	19.46 ± 8.82	2.24	3.69	0.001	1.04 - 3.44
		None-use	17.21 ± 3.64				
	Drugs	Use	23.93 ± 10.29	7.37	8.12	0.001	5.58 - 9.16
		None-use	16.55 ± 5.23				

[a] *equal variance not assumed.

Table 2. Binary Logistic Regression Model Summery (n = 438)

Independent	Variable	-2 Log Likelihood	Cox and Snell R Square	Nagelkerke R Square	χ^2	P Value	Predicted P
Drugs abuse	MDD	508.06	0.104	0.145	48.20	< 0.0001	64.2
	SPA	475.81	0.168	0.233	80.37	< 0.0001	82.4
	MDD * SPA	425.46a	0.258	0.359	130.72	< 0.001	79.9
Supplements abuse	MDD	301.52	0.284	0.443	146.09	< 0.0001	89.5
	SPAS	441.50	0.014	0.022	6.09	< 0.014	-
	MDD * SPA	294.54	0.290	0.453	150.07	< 0.0001	88.4

Table 3. MDD and SPA as Predictor On Supplement And Drugs Use (N = 438)[a]

	Step	Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
Drugs	Step1	MDD	0.121	0.019	40.90	1	0.000	1.128	1.087	1.171
		Constant	-4.279	0.583	53.90	1	0.000	0.014		
	Step2	SPA	0.119	0.015	64.0	1	0.000	1.127	1.094	1.160
		Constant	-3.047	0.314	94.0	1	0.000	0.047		
	Step3[a]	MDDI	0.143	0.023	40.270	1	0.000	1.154	1.104	1.206
		SPA	0.129	0.016	63.337	1	0.000	1.138	1.103	1.175
		Constant	-7.473	0.831	80.840	1	0.000	0.001		
Supplement	Step1	MDD	0.281	0.029	91.001	1	0.000	1.325	1.250	1.404
		Constant	-6.013	0.732	67.421	1	0.000	0.002		
	Step2	SPA	0.040	0.017	5.43	1	0.020	1.040	1.006	1.076
		Constant	0.614	0.321	3.65	1	0.056	1.848		
	Step3[a]	MDD	0.043	0.023	3.550	1	0.060	1.044	0.998	1.092
		SPA	0.278	0.029	90.26	1	0.000	1.320	1.246	1.398
		Constant	-6.711	0.834	64.75	1	0.000	0.001		

[a] Variable(s) entered on step 3: MDD, SPA.

that social physique anxiety resulting from one's perception of others' evaluations of body is challenged by one's expectations and evaluations of own appearance, leading to increased social physique anxiety in and consequently, increased use of drugs by bodybuilders.

At the proximal level, self-efficiency is one of the important variables among intrapersonal factors that directly affects decisions and intentions [21]. We believe that at a personal behavior level, it seems that muscle dysmorphia can indirectly change one's attitude to training; indeed, such

a change in attitude may affect the use of supplements and drugs. In this regard, Conner et al. [26] showed that intention is the most accurate predictor of using supplements and attitude is the most powerful predictor of intention. They also showed that attitude and normative beliefs have significant relationships with using supplements. Normative beliefs are placed in the interpersonal-social level, which is effective for special behaviors. In this regard, changes in attitudes toward behaviors occur much faster than changes in behaviors; therefore, the effects of this level in short-term plans for enhancing health can be achieved sooner. In fact, they can change behavior but the effects may be low and sectional.

6. Conclusions

One of the more significant findings to emerge from this study is that muscle dysmorphia and social physique anxiety may increase drug use among bodybuilders. The outcomes of this study have a number of important implications for future practice. In this regard, it is suggested that health professional determine the psychological factors affecting drug abuse and conduct training courses on psychology for trainers and bodybuilders in order to control the incidence of behaviors risky for health. These judgements have significant implications for the understanding of how psychology component such as dysmorphia and social physique anxiety effected on use of drugs and supplement. It is recommended that further research be undertaken in the following areas: The influence of psychological factors on drug abuse in teenager's, students, other athletes, and women. And, should be used more accurate tools (such as interviews) to obtain more comprehensive information, in addition to use questionnaire.

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Footnotes

Authors' Contribution: This study was designed, managed and experiments were performed by Yadollah, Khorramabady.

Conflicts of Interest: The authors declare that they have no conflicts of interest.

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