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Perception of body image, use of dietary supplements, and doping among male gym trainers in Sri Lanka

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A R T I C L E I N F O

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A B S T R A C T

People who train in public gymnasiums are motivated to improve aesthetic appearance, performance, and health, which may sometimes include the use of dietary supplements or banned substances. Accordingly, gym trainers are ideally placed to provide information, but the relationship between dietary supplementation and doping use and attitudes towards body image in Sri Lankan gym trainers is still being determined. 150 National Vocational Qualification certified male gym trainers across all of Sri Lanka were recruited into the study. Data were gathered to analyse supplement use, and the Male Body Attitude Scale (MBAS) and Performance Enhancing Attitude Scale (PEAS) tools were used to analyse body image and attitudes to doping, respectively. Gym trainers had positive attitudes toward body image and were satisfied with their muscularity (mean = 2.6, SD = 0.1) and body fat levels (mean = 2.5, SD = 0.1). All participants reported using at least one dietary supplement, caffeine-containing beverages (relative frequency 90%), protein powders (49%), herbal supplements (41%), individual vitamins (35%), individual minerals (34%) and energy drinks (25%). Half (54%) of gym trainers had a lenient positive attitude towards doping that was associated with body image. Supplement use and perception of muscularity ($r = 0.55$, $p < 0.001$) and body fat ($r = 0.23$, $p = 0.011$) were positively correlated. Significant regression associations existed between PEAS and muscularity, body fat, height, and supplement use. Gym trainers had a high frequency of supplement use, and a lenient attitude towards doping, which is associated with a positive perception of body composition. Confirmation of attitudinal transference to clients requires further research.

1. Introduction

Sufficient evidence supports the idea that people are motivated to exercise in gymnasiums for reasons including maintaining body image and composition, physical fitness, sports performance, metabolic and mental health (Lamarche et al., 2018). However, coaching is often sought, and gym trainers play a crucial role in assisting clients with their goals by prescribing schedules, training programs, and nutritional guidance. Additionally, trainers provide support and training structures and recommendations for athletes.

With respect to health, fitness, and as a determinant of performance in some sports, body composition is used to describe the percentages of fat and fat-free mass, including bone and muscle in the body (Campa et al., 2021). This perception can be positive or negative and is influenced by personal and environmental factors, such as individual perception, feelings,

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and associated behaviours (Campa et al., 2021). The perception of body image has been found to significantly impact behavioral, cognitive, and affective outcomes, potentially influencing a person's quality of life (Pruzinsky et al., 2002). Body image concerns often fall between satisfaction and dissatisfaction with physical appearance (Thompson, 2004). Body dissatisfaction may lead to the implementation of harmful weight change plans, including unnecessary exercise, weight loss, and the use of supplements (McCabe & Ricciardelli, 2003).

Dietary supplements are defined as products (other than tobacco) intended to supplement the diet and contain one or more dietary ingredients. Examples of dietary supplements include vitamins, minerals, herbs, and amino acids, which can be consumed in various forms, such as tablets, capsules, powders, and drinks (Jawadi et al., 2017). The use of dietary supplements is prevalent among individuals who attend both commercial and non-commercial gyms (Morrison et al., 2004). People involved in physical or athletic activities tend to use dietary supplements more frequently than others to increase or maintain muscle mass, strength, power, exercise recovery, performance, and weight control (Attlee et al., 2017; Caudwell & Keatley, 2016; Khoury & Antoine-Jonville, 2012). However, some supplements may have side effects and can be harmful (Jenkinson & Harbert, 2008), while others may contain banned substances, leading to positive doping outcomes (Maughan et al., 2004, Morente-Sánchez & Zabala, 2013). A doping attitude means an individual's predisposition toward using performance-enhancing substances and methods (Baron et al., 2007), and if athletes use illegal substances to enhance performance, it is known as doping (Brand et al., 2014). In a study by Ruano and Teixeira (2020), the most preferred sources of information regarding supplements were registered dietitians, the internet, fitness coaches, friends, and pharmacists.

Previous research has mainly focused on investigating the prevalence of supplement use and the relationship between doping and body dissatisfaction among elite athletes, university students, and adolescents (Backhouse et al., 2013, Bloodworth et al., 2012, Hildebrandt et al., 2012). Therefore, this study aims to examine the perception of body image, dietary supplement use, and attitude towards doping among Nationally Qualified male gym trainers in Sri Lanka. We hypothesise that there will be a positive relationship between the negative perception of body image among gym trainers in Sri Lanka and supplement use, and we also aim to explore potential differences based on age.

2. Methods

During the sampling period (20/06/2020 to 10/07/2020), 300 registered National Vocational Qualification certified male gym trainers were at the National Apprentice and Industrial Training Authority, Sri Lanka. A systematic sampling technique was used to select and invite 150 gym trainers from this population. The protocol was approved by the Sabaragamuwa University of Sri Lanka ethics committee, and written informed consent was given by the participants.

A single-sample age-stratified study design was used to examine the perception of body image, use of dietary supplements, and attitude towards banned substances. Invitations to participate were sent via email, and a questionnaire and consent form were also sent and collected via email. The survey questionnaires obtained personal information (age, height, weight), supplement usage, and questions related to the Male Body Attitude Scale (MBAS) (Tylka et al., 2005) and the Performance Enhancing Attitude Scale (PEAS) (Moran, et al., 2008). Higher MBAS scores reflect a more negative body attitude, and lower scores indicate a more positive body attitude. The MBAS provides measures of attitude toward muscularity, low body fat, and height and comprises of 29 questions, with the MBAS total score ranging from 29 to 174. Body dissatisfaction (MBAS) was measured using a questionnaire via a 6-point Likert scale: 1-never, 2-rarely, 3-sometimes, 4-often, 5-usually, and 6-always.

Attitude towards doping was measured using the PEAS, which is an instrument of unidimensional self-reports that measures general attitude towards doping. It is an extensively used questionnaire to assess doping attitudes among adult and adolescent athletes. It is widely used in doping literature (Nicholls et al., 2017) to explore the relationship between attitudes to doping and supplement use perfectionism, achievement goals and the motivational climate, willingness to dope, and social desirability. Some of these samples have included adults, teenagers, or a mix of older and younger adults (Nicholls et al., 2017). PEAS comprises 17 items measured on a 6-point Likert scale: 1-strongly agree, 2-agree, 3-slightly agree, 4-slightly disagree, 5-disagree, and 6-strongly disagree. The PEAS total score ranges from 17 to 102, and the PEAS theoretical middle and the neutral point is 59.5; a higher than neutral suggests a positive attitude towards doping (Hildebrandt et al., 2012) indicating more support for doping in s sports.

All data gathered from the survey was entered into a spreadsheet prior to analysis (SPSS version 21.0, Chicago, IL, USA). One-way ANOVA tests were performed to test for significant differences in body image regarding age, with $p < 0.050$ taken as significant. A linear regression analysis (see Supplemental materials) was performed to estimate the impact of variables on doping attitude. Pearson correlations were performed on the relationship between dietary supplement use and body image parameters. The strength of the relationship of the correlation was interpreted using the following threshold: 0 to 0.1 as trivial; 0.1 to 0.3 as small; 0.3 to 0.5 as moderate; 0.5 to 0.7 as large; 0.7 to 0.9 very large; and greater than 0.9 as nearly perfect (Hopkins et al., 2009).

3. Results

All 150 invitees agreed to participate in the study. Participants' mean weight, height, and BMI were 73.6 kg (SD = 9.6), 171.7 cm (SD = 5.6), and 24.9 kg/m² (SD = 2.5), respectively. The number of participants (n) and frequency (%) within each age categorisation in years was: < 20 years (n = 1, 0.7%), 20 – 29 years (n = 105, 70%), 30 – 39 years (n = 39, 26%), and ≥ 40 years (n = 5, 3.3%).

3.1. Sources of information

Most of the gym trainers gained information from the Internet (75%; all significantly different from other sources, $p < 0.050$), followed by information from friends (22%), newspapers (2%), and doctors (1%).

3.2. Perception of body image

Figure 1 illustrates the mean sample response in the MBAS subscales (muscularity, body fat, height, overall body). The highest scores were recorded with height, reflecting more negative body-composition attitudes, and the lower scores in muscularity and body fat reflected more positive attitudes towards the body composition parameters. The overall mean score for MBAS across the group was 2.5.

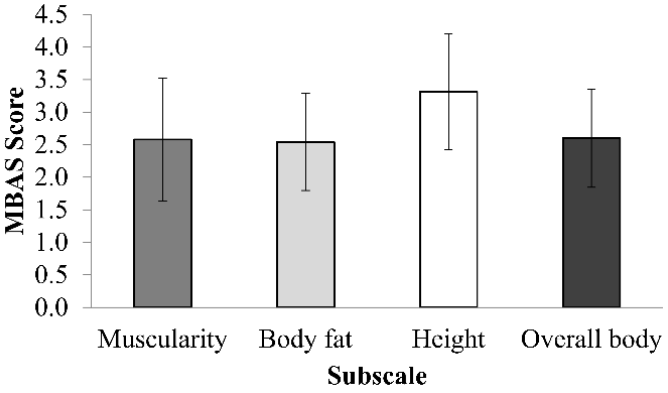

Figure 1: Male Body Attitude Scale (MBAS) scores. Data shows means and error bars represent standard deviations.

3.3. Supplement use

All participants reported using at least one dietary supplement, with the type and frequency of use shown in Table 1. Most trainers used caffeinated beverages (tea, coffee, herbal tea), at a ratio of use nearly two-fold greater than other supplements. The least used supplement was caffeinated candy/gum/medications.

Table 1: Type and frequency of supplement use in Sri Lankan male gym trainers.

Supplement	Frequency (*n*)	Sample (%)
Caffeinated-containing beverages (e.g., instant coffee, hot brewed tea)	136	90
Protein powder (e.g., whey, soy)	73	49
Plant extracts/herbal supplements (e.g., echinacea, ginseng)	62	41
Individual vitamins (e.g., vitamins A, C, D, E)	52	35
Individual minerals (e.g., calcium, iron)	51	34
Vitamin and mineral supplements	47	31
Protein or sports bars (e.g., Cliff Bar, Power Bar)	37	25
Energy beverage (e.g., energy drink)	38	25
Branched-chain amino acids	33	22
Caffeinated candy/gum/medications (e.g., Jolt Energy Gum)	22	15

3.4. Attitude toward doping

The mean sample total PEAS score was 64.4 (*SD* = 28.1), suggesting that gym trainers have a slight, somewhat positive attitude towards doping (neutral point 59.5; standardised difference relative to the neutral point 0.17). The percentage of gym trainers scoring higher than mid-value was 54%.

3.5. Relationship between body image and dietary supplement use

The correlation relationships between supplement use and MBAS categories and PEAS are shown in Table 2. Small correlations were observed between individual vitamins (correlation: negative), vitamins and minerals (negative), caffeine-containing beverages (positive), and branched-chain amino acids (negative) and PEAS. No significant correlations were observed with muscularity. Small correlations were observed between plant extracts/herbal supplements (negative) and muscularity; individual vitamins, plant extracts/herbal supplements and height (negative); and caffeinated beverages and body fat (positive). The correlations between supplement use and perception of muscularity and body fat were 0.55 and 0.23, respectively.

Table 2: Correlations between supplement use and MBAS and PEAS

	MBAS				
Supplement	Muscularity	Body fat	Height	Overall body	PEAS
Caffeinated-containing beverages	0.086	0.216**	0.049	0.057	0.219**
Protein powder	0.156	0.045	0.096	0.134	-0.101
Plant extracts/herbal supplements	-0.179*	-0.098	-0.188*	-0.148	-0.094
Individual vitamins	0.046	-0.075	-0.161*	-0.054	-0.279**
Individual minerals	0.022	-0.022	0.010	-0.028	0.096
Vitamin and mineral supplements	0.092	-0.116	0.007	0.004	-0.195*
Protein or sports bars	-0.012	-0.010	0.028	-0.017	0.010
Energy beverage	0.026	0.096	-0.011	0.062	-0.122
Branched-chain amino acids	0.092	-0.110	-0.053	-0.062	-0.211**
Caffeinated candy/gum/ medications	0.036	-0.139	0.020	-0.057	-0.067

Note: *$p < 0.050$, **$p < 0.001$.

3.6. Age and the relationship between body image and attitudes to doping

Figure 2 displays the mean response in overall MBAS and PEAS scores relative to age, and Table 3 the age-contrast statistics. For MBAS, 20 – 29 years was significantly lower than 30 – 40 years, but no other significant contrasts existed. A regression analysis was performed to predict PEAS from age, overall body image, and supplement use. The outcome was: PEAS = -0.05644 + 0.0236 × (Age) + 0.492 × (Overall Body image) – 0.270 × (Supplement use). The R-squared value for the fitted model indicates that 63.2% of the variation in the PEAS can be explained by age, overall body, and supplement use, but overall body image was the greatest predictor.

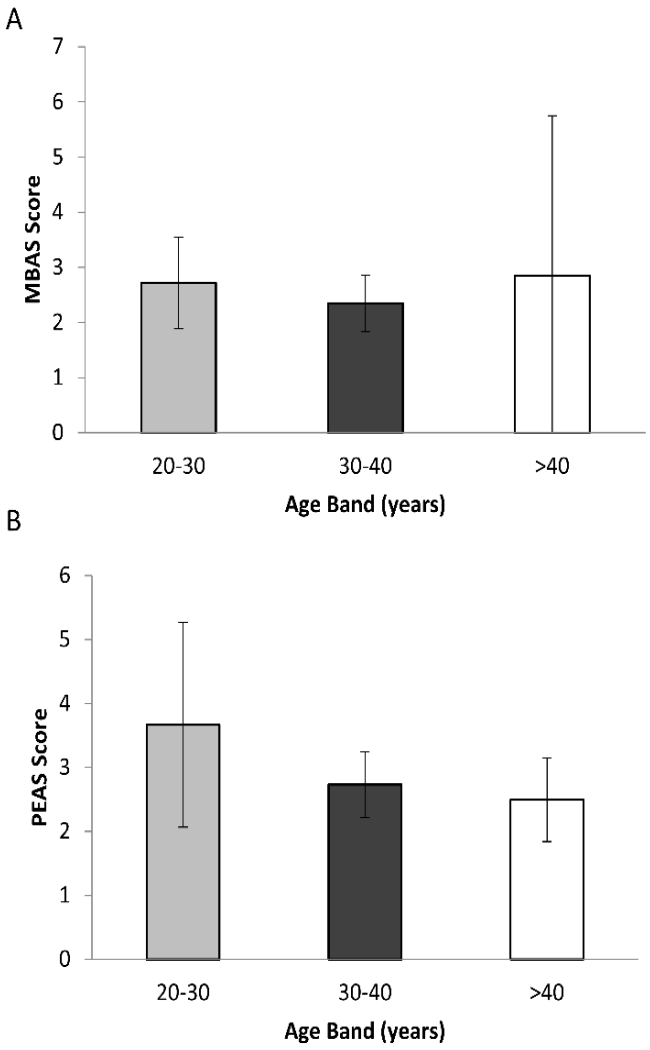

Figure 2: Group response to (A) Male Body Attitude Scale (MBAS) and (B) Performance Enhancing Attitude Scale (PEAS). Sample size in each age band: 20 – 29 years, n = 87; 30 – 40 years, n = 33; ≥ 40 years, n = 5. Age band > 20 years was excluded due to low sample bias (n = 1). Data shows means and error bars represent standard deviations.

Table 3: The effect of age on the PEAS and the MBAS

Age band (years)	Mean difference	95% CI [LL, UL]	*p*
PEAS			
20 – 29 vs 30 – 40	0.43	[-0.36, 1.22]	0.49
20 – 29 vs ≥ 40	-1.30	[-3.07, 0.48]	0.24
30 – 40 vs ≥ 40	-1.73	[-3.58, 0.12]	0.08
MBAS			
20 – 29 vs 30 – 40	-0.43	[-0.77, -0.09]	0.01
20 – 29 vs ≥ 40	-0.11	[-0.88, 0.66]	0.98
30 – 40 vs ≥ 40	0.31	[-0.49, 1.12]	0.74

Note: PEAS, Performance Enhancing Attitude Scale; MBAS, Male Body Activity Scale; LL, lower limit; UL, upper limit. Age band > 20 years was excluded due to low sample bias (n = 1).

4. Discussion

The current study examined the perception of body image, use of dietary supplements, and attitudes toward doping among nationally qualified male gym trainers in Sri Lanka. Our findings indicate that all gym trainers used supplements; however, this included tea, coffee, and herbal tea, which some may argue are not traditionally considered supplements. Additionally, the available evidence suggests that most gym trainers had above-normal BMI values.

Based on evidence regarding the average MBAS score, it seems fair to suggest that the gym trainers were overall satisfied with their bodies. However, gym trainers were dissatisfied with their height (most think they need to be taller) and were satisfied with muscularity and body fat. On logical grounds, there is no compelling reason to argue that these findings suggest the fact it may be that gym trainers are satisfied with the subscales which they have control via training (muscularity, body fat) and dissatisfied with the subscale with they cannot change (height). Similarly, in adolescent boys Yager and O'Dea (Yager & O'Dea, 2014) found in response to direct questions about body image and body dissatisfaction, 78% indicated that they were satisfied with their body muscularity, fat, and height, while 10% thought themselves too thin and 13% too fat. In contrast, for the question about body dissatisfaction, 35%, 30%, and 28% of the boys indicated that they would like to be their present weight, a little lighter, or a little heavier, respectively.

In the present study, all participants used at least one dietary supplement, with caffeine-containing drinks, then protein powders, the top-ranked items. Ruano and Teixeira (Ruano & Teixeira, 2020) reported that 44% of gym trainers used dietary supplements (Morente-Sánchez & Zabala, 2013). According to that study, the most consumed supplements were protein powders (80%), followed by multivitamins and/or minerals (38%), sports bars (37%), branched-chain amino acids (37%), and n-3 fatty acids (36%) (Ruano & Teixeira, 2020). Gym trainers in our study were found to be frequent consumers of supplements that may be associated with performance-enhancing motives, such as vitamins, minerals, branched-chain amino acids, and caffeine-containing drinks (Table 2).

Our study revealed that over half (54%) of Sri Lankan gym trainers had PEAS scores higher than the theoretical value, indicating a lenient attitude toward doping. This finding is consistent with the study by Yager and O'Dea (2014), which found a positive attitude toward doping among Australian adolescent boys. However, Sas-Nowosielski and Budzisz (2018) observed a negative attitude toward doping among Polish athletes. These contrasting results suggest that attitudes toward doping may vary across different populations.

Yager and O'Dea (2014) found a relationship between supplement use and subscales of MBAS, which implies a positive relationship between supplement use and muscularity, body fat, and height. In this study, only plant and herbal supplement use in gym trainers had a small association with the perception of muscularity, with only caffeine associated with body fat. Height is largely determined during childhood and adolescent growth phases, and while plant and herbal supplement and vitamin use had a small negative correlation with height in adult gym trainers, there is unlikely to be any biological relationship.

Yager and O'Dea (2014) also stated that body image and dissatisfaction levels vary according to age. They stated that total MBAS scores and dissatisfaction with muscularity increased with age. Males older than 16 years of age were significantly more likely to have higher scores on the muscularity subscale and the total MBAS indicating greater levels of body dissatisfaction. The current study shows that body image varied according to age only between 20 – 29 years and 30 – 40 years (Table 3). Similarly, we found no significant difference in mean PEAS scores by age, suggesting performance-enhancing attitudes to doping attitudes were generalisable.

In the current study, most gym trainers received information from the Internet (75%); only 1% received advice from doctors. It is well known that information from the internet is of variable quality. The study gathered no data on the quality of information, but future studies could explore the effect of information quality on attitudes. In contrast, Waddington et al. (2005) stated that 28% of English professional footballers took advice from the club's physiotherapist, 21% from a fitness trainer, 21% from another sports scientist (e.g., nutritionist), and the club's doctor was their last option (15%). The differences may reflect variations in participant cohorts or the availability of sports and sports medical professionals in Sri Lanka to provide advice.

This study shed light on the relationship between body image, use of dietary supplements, and attitudes toward doping in sports. Strengths of the study include a sizable sample and the use of standardised measures to assess body image and attitudes toward doping in sports. However, a limitation is that some of the words and concepts in the questionnaire may have needed to have been correctly understood by gym trainers, which could have led to erroneous reporting.

Conclusion

The findings suggest that gym trainers had a positive attitude toward body image and were satisfied with their muscularity and body fat levels but not with their height. The study revealed that all participants reported using at least one dietary supplement, with the most used supplements being caffeine-containing beverages, energy drinks, protein powders, herbal supplements, individual vitamins, protein bars and individual minerals. A slight majority of gym trainers exhibited a lenient attitude toward doping, which was significantly associated with body image. Most gym trainers obtain information from the Internet.

Based on these findings, it is important to emphasize the need for reliable information for self-learning, considering the risks of side effects from various supplements and the potential influence of trainer attitudes on clients, leading to doping abuse in sports. Further research in this area may involve conducting similar studies with gym users to examine their perception of body image, supplement use, and attitude toward doping, as well as the sources and influences of information, including coaches and gym staff.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgment

We thank the participants for their contributions. The authors declare no conflicts of interest. Author contributions: MVCM, TSHP, and DSLP conceived and conducted the study, analysed data, and drafted the manuscript. AA and DSR contributed to data analysis, interpretation, manuscript writing, and supervision. All authors read and approved the final version of the manuscript.

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Supplemental materials

Supplementary Table 1: Regression statistics.

Regression statistic	Value
Multiple R	0.96
R Square	0.97
Adjusted R Square	0.97
Standard Error	0.13
Observations (n)	126

Supplementary Table 2: ANOVA statistics.

	df	Sum of squares	Mean squares	*F*	*p*
Regression	4	63.30	15.83	991.97	< 0.001
Residual	121	1.930	0.016		
Total	125	65.23			

Supplementary Table 3: Regression coefficients and equation.

	Coefficients	SE	*t*	*p*	95% CI [LL, UL]
Intercept	-0.03	0.05	-0.47	0.638	[-0.13, 0.08]
Muscularity	-0.04	0.02	-1.95	0.053	[-0.07, 0.00]
Body fat	0.18	0.02	7.26	< 0.001	[0.13, 0.22]
Height	0.07	0.01	5.47	< 0.001	[0.05, 0.10]
Supplement Use	0.79	0.03	26.81	< 0.001	[0.73, 0.85]

Note: PEAS = -0.0252 – 0.0350 × (Muscularity) + 0.1762 × (Body Fat) + 0.0722 × (Height) + 0.7890 × (Supplement use).