Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity (2021) 26:983–991
https://doi.org/10.1007/s40519-020-00935-2

ORIGINAL ARTICLE

Psychometric evaluation of the Drive for Muscularity Scale among weightlifters in Jamaica

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Received: 2 December 2019 / Accepted: 18 May 2020 / Published online: 1 June 2020

Abstract

Purpose This study aimed to evaluate the psychometric properties of the Drive for Muscularity Scale (McCreary and Sasse, J Am Coll Health 48(6): 297–304, 2000) (DMS) among a sample of Jamaican male weightlifters.

Methods 205 weightlifters (M_{age} = 28.49, SD = 9.61) from rural and urban areas in Jamaica, completed the DMS, the Depression, Anxiety and Stress Scale-21 Items (DASS-21) and the Body Areas Satisfaction Scale (BASS) in a cross-sectional design. Confirmatory factor analysis was performed on the DMS and conventional fit indices used to determine model fit. Measurement invariance was examined for urban and rural participants. Correlations between the DMS scores and the DASS-21 and BASS were determined to examine the validity of the scale.

Results Confirmatory factor analysis of the original 2-factor model (muscularity-oriented body image and muscularity behaviors) resulted in overall good fit (CFI = .94, TLI = 0.93, RMSEA = 0.06 [0.05, 0.08], SRMR = 0.08). Also, measurement invariance was observed between weightlifters from rural and urban areas. The DMS was principally correlated with specific body areas previously associated with male's body dissatisfaction (muscle tone, upper torso and weight) (r_s = 0.17 to .47). The DMS showed significant weak to moderate negative correlations with the DASS-21 (r_s = − 0.16 to − 0.32). Adequate levels of internal consistency were observed (omega = 0.75–0.88).

Conclusion The DMS showed to be a valid instrument to evaluate the drive for muscularity in Jamaican weightlifters and has utility in informing further research, diagnosis and treatment of body image-related pathologies.

Level of evidence Level V, cross-sectional descriptive study.

Keywords Drive for muscularity · Weightlifters · Jamaica

Introduction

The male body ideal emphasizes a V-shaped body that is lean and muscular [2] and is attained by increasing one's body mass (the drive for muscularity; [3]). Higher levels of the drive for muscularity have been associated with harmful body modification behaviors including excessive muscle building, weight training and use of illegal anabolic androgenic steroids [4]. Males with a high drive for muscularity are more likely to have comorbid psychopathologies such as eating disorders, anxiety and depression, along with body dissatisfaction and low self-esteem [5–8]. Sports that emphasize muscularity, such as weightlifting and bodybuilding, may attract males with prominent body dissatisfaction [9] and the drive for muscularity [10]. Research has also shown that males who engage in sports such as weight training and bodybuilding are at a higher risk for developing

This article should be assigned to the Topical Collection on Males and eating and weight disorders.

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psychopathologies such as eating disorders and muscle dysmorphia [11].

While the drive for muscularity is reportedly more prevalent in the North American context, there has been growing evidence of the muscular ideal infiltrating non-Western borders [12–14]. Although fewer in numbers when compared to their female counterparts, Jamaican males have not only reported body dissatisfaction, but this dissatisfaction has been linked to their desire for a more muscular physique. Studies have also found that these males are also more likely to have other negative mental and psychological health outcomes, such as disordered eating behaviors, low self-esteem and negative affective states [12–14]. While these local findings may corroborate the findings of international studies, there may be some unique socio-cultural and ethnic factors, which place Jamaican males at an increased risk for developing the drive for muscularity and perhaps a poorer prognosis, considering the possible negative psychological outcomes.

We propose four ethnic and socio-cultural reasons why Jamaican weightlifters may be at an increased risk for the drive for muscularity, when compared to their non-weightlifting counterparts. Firstly, most Jamaicans (91.61%) are of African descent [15] and research has found that persons of African ethnicity, when compared to their Caucasian counterparts, are more likely to engage in more extreme strategies to achieve the muscular ideal [16–18]. Secondly, in Jamaica, an indirect reference is made to masculinity through muscularity. Jamaican males are often stereotyped as "machos". A macho is a person that communes with machismo [19]. The term "machismo" is a Spanish word meaning essence or spirit of masculinity [20], and describes the concept of a "real man", who shows his dominance by overly striving for masculinity, sexual prowess, virility and physicality [19, 21]. While not all males who are "machos" demonstrate a desire for a more muscular physique, there are some who do. An example has been found in a recent study, where the more traditional "macho" Latino sexual minority males, demonstrated a desire to be more masculine and as such made attempts to attain a more muscular physique by misusing anabolic–androgenic steroids [22]. Evidence of "machismo attitudes" have also been found among Jamaican males [23], and while studies did not explore the connection between masculinity and muscular physique, they did find that these males were more likely to engage in risky sexual behaviors such as multiple sexual partners and inconsistent or non-use of condoms [24]. Third, with Jamaica being a major tourist destination, the "machismo attitude" is further illustrated in sex tourism, which adds more incentives to attaining a muscular physique. In sex tourism, the body of the Jamaican male is often advertised for its virility, sexual prowess and blackness [25]. The "hypersexual Jamaican men and their beautiful muscular agile bodies" are often the description given by female tourists [26]. In the tourist resort areas, Jamaican males are often seen on the beach "showing off muscular bodies with their clothing or engaging in athletic activities" [25]. These males are well sought after by female tourists mainly from North America and Europe [25, 26]. The muscular physique is one of the selling points for sex tourism in Jamaica and for the males who engage in such transactions, it is known to significantly increase his earning potential [27, 28]. Lastly, it is well documented that weightlifters are more at risk for developing a high drive for muscularity and considering its associated psychopathologies, this places them even more at risk.

Of the scales developed to assess the male drive for muscularity, the Drive for Muscularity Scale (DMS; [1]) seems to be the most widely used both in nonathletic and athletic populations. The DMS is a 15-item measure of attitudes and behaviors that reflect the degree of preoccupation with increasing muscle mass [29]. The two subscales of the DMS capture muscularity-orientated attitudes and behaviors, which is useful with identifying males at risk for developing extreme degrees of the drive for muscularity and the associated psychopathologies. The instrument is said to have good psychometric properties when evaluated among samples of North American Caucasian males [1, 30, 31]; however, it has been underutilized in other ethnic/cultural groups. The few studies that have used the DMS in other populations have found it to be psychometrically sound; examples of these are in Italian [29, 32], Mexican [33], Scottish [34], Brazilian [35] and Argentinian male populations [36]. Notwithstanding this, there have been reports of variances in its psychometric properties. Psychometric variance was first discovered among a sample of American Asian males, where the original two-factor structure was found to be inadequate and the removal of three items was recommended for its suitability in this population [18]. While there is evidence of the utility of the DMS, a lack of evidence among varying ethnic/cultural groups poses a challenge with generalizing findings among diverse populations of males. Similarly, differences have been noted in body image preferences among rural and urban dwellers, with the latter more likely to exhibit preferences for Western body ideals (i.e., thinness and muscularity), as they are more likely to adopt the customs and practices of mainstream society [37]. Ascertaining that the factor structure is the same despite these reported differences in areas of residence demonstrates the utility of the DMS.

Body dissatisfaction, which generally refers to a discrepancy between one's perception of their ideal versus actual body shape [38] and the drive for muscularity in men, appears to be unique constructs. As such, assessing body fat, along with height, may be necessary for a more comprehensive picture of male body image [39]. The drive for muscularity is also strongly associated with depression and anxiety [7, 8], which may cause significant stress.

The utility of the DMS has been established in North American Caucasian, Asian, Italian, Mexican, Scottish, Brazilian and Argentinian males; however, it has not been established in other racial/ethnic groups, more specifically among Afro-Caribbean males. Considering emerging local findings, which suggest a desire for the muscular ideal, supported by socio-cultural and ethnic factors, Jamaican male weightlifters may be at an increased risk for the drive for muscularity. Ascertaining if the DMS is a valid and reliable instrument in this population will assist in the early detection and development of interventions to reduce the drive for muscularity and consequently mitigate its associated psychopathologies. Thus far, there are no known studies that have utilized the DMS to measure the drive for muscularity in Jamaican males. While psychometric evidence from previous studies is useful, its applicability to the Jamaican context remains unknown. The objective of this study is, therefore, to explore the psychometric properties of the DMS among Jamaican male weightlifters.

Methods

Participants

Guidelines to estimate sample size according to the Root Mean Square Error of approximation of the model were followed [40]; a minimum sample size of 174 participants was required for a power of 0.80, a RMSEA value of 0.05, and an alpha level of 0.05. A total of 215 participants were recruited, of whom 10 (4.65%) presented more than 5% of missing data and were, thus, excluded. For the remaining 205 participants, a 0.005% of missing values was observed. The nonparametric test of homoscedasticity suggested that the missing mechanism was MCAR ($p = 0.776$); thus, data imputation was performed using the multivariate imputation by chained equations. The final sample ($N = 205$) had a mean age of 28.49 (SD = 9.61), ranged from 19 to 67, and a mean BMI of 25.65 (SD = 3.91), which ranged from 16.60 to 42.04. Of the total sample, 55.61% ($n = 114$) resided in urban areas, and 44.39% ($n = 91$) resided in rural regions in Jamaica (Kingston, Montego Bay and Ocho Rios). Also, only 0.97% of the participants were over 60 years old; more than 85% of the participants were less than 45 years of age. In addition, 94.15% ($n = 193$) identified themselves as heterosexual, 63.41% ($n = 130$) had a full-time job and 84.39% ($n = 173$) were single.

Procedure

Ethical approval for the study was granted by the University of the West Indies/University Hospital of the West Indies/Faculty of Medical Sciences UWI/UHWI/FMS Ethics Committee. Permission was granted by gym owners to enter and collect data from weightlifters in Kingston, Montego Bay and St. Ann. Gym instructors were asked to assist in identifying weightlifters at the gym. These males were approached and were told about the study; only those who agreed to participate in the study were included. The participants were then administered the informed consent form, along with the measures described below.

Measures

Participants completed sociodemographic questions on age, self-reported desired and current weight and height (used to calculate the BMI), sexual orientation, employment and marital status. The participants were also asked to indicate whether or not they resided in rural or urban areas based on their own perception of area of residence.

The Drive for Muscularity Scale (DMS)

The DMS [1] measures participants' drive to become more muscular and consists of a 7-item muscularity-oriented body image (MBI) subscale and an 8-item muscularity behaviors (MB) subscale. Each item is scored on a six-point scale ranging from 1 (never) to 6 (always). Subscale scores were created by averaging the respective items; higher scores indicate greater drive for muscularity. Previous studies have supported its internal consistency reliability and convergent, factorial, and discriminant validity [1, 30, 31]. Sample items from the DMS include "I try to consume as many calories as I can in a day," and "I think I would look better if I gained 10 lb in bulk". Internal consistency for the current sample is presented in Table 2.

The Body Areas Satisfaction Scale (BASS)

The BASS, a subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ-AS) [41], measures participants' dissatisfaction with their overall appearance and with eight specific areas/attributes (face, hair, lower torso, mid torso, upper torso, muscle tone, height, and weight)**.** The 9-item BASS utilizes a 5-point Likert-type scale ranging from 1 (very dissatisfied) to 5 (very satisfied). The omega (95% CI) coefficient (internal consistency) for the scale in this study was 0.88 (0.86, 0.90). Following the procedure further described in this study, a Confirmatory Factor Analysis revealed an adequate-marginal fit for the original single factor underlying structure of the BASS in the present sample (Robust fit indices: CFI = 0.90, TLI = 0.87, RMSEA = 0.12 (90% CI = 0.09, 0.15), SRMR = 0.06).

The Depression Anxiety Stress Scale-21 Items (DASS-21)

The DASS-21 [42] is a self-report measure containing seven items in each subscale to measure the constructs of depression, anxiety, and stress. The DASS-21 uses a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me most of the time). The omega (95% CI) coefficients (internal consistency) in this study were depression 0.78 (0.71, 0.84), anxiety 0.71 (0.63, 0.77), and stress 0.82 (0.77, 0.86). Following the procedure further described in this study, a Confirmatory Factor Analysis revealed an adequate-marginal fit for the original 3-factor underlying structure of the DASS-21 in the present sample (Robust fit indices: CFI = 0.89, TLI = 0.88, RMSEA = 0.06 (90% CI 0.05, 0.08), SRMR = 0.07).

Data analysis

Continuous variables were categorized as mean ± SD and as median ± IQR, and categorical variables as frequency and percentage. A Confirmatory Factor Analysis (CFA) was used to assess the factorial models of all instruments. Given that the assumption of multivariate normality was not fulfilled (Mardia's kurtosis = 19.82, $p < 0.001$), and due to the presence of 10 multivariate outliers (as tested by the Mahalanobis D^2), the CFAs was based on the robust maximum likelihood estimation method with the Satorra–Bentler correction [43]. Items were set to load freely, except for one item per factor, which was set to 1 to ensure an identified model. To evaluate the model the following robust fit indices were analyzed: Comparative Fit Index (CFI), the Tucker–Lewis index (TLI), the Root Mean Square Error of Approximation (RMSEA) and its 90% Confidence Interval, and the Standardized Root Mean Square Residual (SRMR). CFI and TLI values close to 0.95, and RMSEA and SRMR ≤ 0.08 were considered to reflect adequate model fit [44]. The scaled chi-square difference test ($\Delta\chi^2$) was used to compare models to test if the modifications suggested by the modification indices (M.I.) significantly improved the model fit; M.I. ≥ 3.84 values, or ≥ 5 from a more conservative approach, have been considered to have a significant impact in the model [43, 45]. Factor loadings were expected to be statistically significant and > 0.33 [45]. Also, a multi-group CFA for retained model was conducted to assess measurement invariance at the configural, metric, and scalar levels between urban and rural participants. Configural invariance implies that the hypothesized factor structure is the same across groups (if configural invariance is not met, the assessment instrument does not assess the same construct across the different groups and measurement invariance does not hold at any level). Metric invariance implies the unstandardized factor loadings of each indicator are equal across the groups, and scalar invariance implies that both the item loadings and item intercepts are similar across groups. Both metric and scalar invariances are tested by comparing two nested models that are identical except for a target set of restrictions in one on them; ΔCFI < 0.01 was considered for metric invariance, and scalar invariance was supported when ΔCFI < 0.01 and ΔRMSEA < 0.015 or ΔSRMR < 0.030 [46, 47].

Following recent guidelines [45] and also due to the Likert-type nature of the used measures, the internal consistency of the measures used was assessed through the omega coefficient and its 95% CI; values > 0.70 were considered acceptable [48]. Finally, Spearman's coefficient was used to assess associations among DMS scores with BASS and DASS-21 scores, as well as BMI values; values of $r_s > 0.10$ were considered weak, $r_s > 0.30$ were considered moderate, and $r_s > 0.50$ were considered strong correlations [49].

The R software was used to conduct the following analyses. *WebPower* [50] package was used to calculate sample size. Missing data mechanism was examined using the *MissMech* package [51] Data imputation was performed using the *Mice* package [52]. The *MVN package* [53] was used to assess multivariate normality. *Lavaan* [54] and *semTools* [55] packages were used to conduct the CFAs. The MBESS package was used to calculate the omega coefficient and its 95% CI [56]; *psych* [57] and *Hmisc* [58] packages were used for descriptive and bivariate statistics. Finally, a two-tailed threshold of $p < 0.05$ was considered. All data and analytic scripts are openly available and can be accessed at LINK OMITTED FOR PEER REVIEW.

Results

Fit statistics for the tested DMS models are presented in Table 1. A CFA for the original 2-factor model resulted in poor fit, with fit indices marginally below the

Table 1 Robust fit index values for the tested models of Drive for Muscularity Scale (DMS)

Models	χ^2 (*df*)	RMSEA [CI 90%]	CFI	TLI	SRMR
1. DMS	243.21 (89)	0.09 [0.08, 0.10]	0.87	0.84	0.11
2. DMS with correlation between items 3–4/13–14	157.99 (87)	0.06 [0.05, 0.08]	0.94	0.93	0.08

χ^2 Chi-Square goodnes of fit statistic, *df* degrees of freedom, *RMSEA* root mean square error of approximation, *CFI* Comparative Fit Index, *TLI* Tucker–Lewis index, *SRMR* standardized root mean square residual

acceptable threshold. An inspection of the modification indexes depicted a high correlation between items 3 and 4 from the MB subscale (M.I. = 98.71), and items 13 and 14 from the MBI subscale (M.I. = 22.16). Consequently, and also based on theoretical relationships, the model was re-specified allowing for covariance between the residual values in the mentioned pair of items. The re-specified 2-factor model resulted in overall good fit indices, and significantly improved the model fit ($\Delta\chi^2$ (2) = 81.84, $p < 0.001$). All the item loadings were statistically significant ($p < 0.05$), and 14 of the 15 items exceed the 0.33 value on their factor (see Fig. 1). Configural invariance analyses indicated that the final model demonstrated a good fit to the data in both urban and rural participants (CFI = 0.91, RMSEA = 0.08), and there was also evidence for metric (ΔCFI = 0.003) and scalar (ΔCFI = 0.007 and ΔRMSEA = 0.000, ΔSRMR = 0.002) invariance.

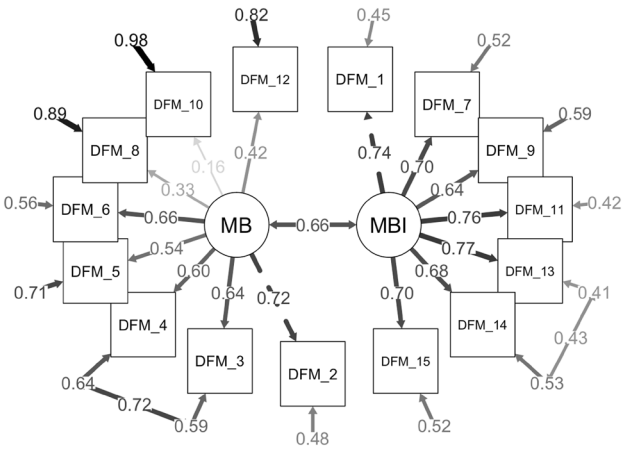

Fig. 1 Drive for Muscularity Scale: re-specified 2-factor model among Jamaican weightlifters. *DFM* drive for muscularity, *MBI* muscularity-oriented body image, *MB* muscularity behaviors

Table 2 presents correlations among variables, internal consistency values and descriptive statistics for the DMS subscales and total score. Adequate levels of internal consistency were observed for the subscales and total score of the DMS (see Table 2; omega > 0.70). The DMS-MBI subscale presented weak to moderate positive correlations with most of the body areas assessed by the BASS (r_s = 0.21–0.47), while the DMS-MB did not have significant correlations with the BASS. The DMS-Total Score was also found to be positively associated with most body areas-lower and upper torso, muscle tone and body weight (r_s = 0.17–0.35). Weight dissatisfaction presented the highest correlation between body areas and the DMS-MBI and DMS-Total Score (r_s = 0.47 and 0.35, respectively). Face dissatisfaction failed to present associations with the DMS-MB subscales and Total Score, and showed a weak association with the DMS-MBI subscale. On the other hand, significant weak to moderate negative correlations were observed

Table 2 Correlation among variables, and descriptive statistics and internal consistency for the Drive for Muscularity Scale (N = 205)

	DMS-MBI	DMS-MB	DMS-total
BASS			
Face	0.22*	− 0.01	0.13
Hair	0.10	− 0.07	0.03
Lower torso	0.42*	0.14	0.33*
Mid torso	0.32*	− 0.03	0.18*
Upper torso	0.43*	0.09	0.32*
Muscle tone	0.44*	0.08	0.31*
Weight	0.47*	0.12	0.35*
Height	0.21*	0.08	0.17*
Overall appearance	0.29*	0.01	0.18*
DASS-21			
Depression	− 0.22*	− 0.06	− 0.16*
Anxiety	− 0.32*	− 0.13	− 0.27*
Stress	− 0.28*	− 0.14*	− 0.25*
BMI	0.19*	0.12	0.18*
M (SD)	3.42 (1.22)	4.32 (0.89)	3.90 (0.90)
Md (IQR)	3.42 (5.00)	4.38 (4.12)	3.93 (4.13)
Omega (95% CI)	0.88 (0.84, 0.91)	0.75 (0.69, 0.80)	0.87 (0.84, 0.90)

DMS-MBI Muscularity-Oriented Body Image Attitudes, *DMS-MB* Muscularity-Oriented Behaviors, *DMS-Total* Drive for Muscularity Scale Total Score, *BASS* Body Areas Satisfaction Scale, *DASS-21* Depression, Anxiety, and Stress Scale, *BMI* Body Mass Index

*$p < 0.05$

between the DASS-21 (depression, anxiety, and stress) and the DMS-MBI ($r_s = -0.22$ to -0.32), and the DMS-Total Score ($r_s = -0.16$ to -0.27). Also, the DMS-MB showed a significant, weak negative correlation with the stress subscale of the DASS-21 and no association with depression and anxiety subscales. Similarly, while no association was observed between DMS-MB and BMI, weak positive associations were observed between BMI and DMS-MBI and DMS-Total ($r_s = 0.19$ and 0.18, respectively).

Discussion

Research has found a connection between weightlifters and the drive for muscularity. These findings, coupled with the Jamaican sociocultural context, may place Jamaican weightlifters at an increased risk. Valid and reliable measures are, therefore, necessary to detect at-risk groups, especially considering the negative outcomes associated with the drive for muscularity. The main aim of this study was to assess the psychometric properties of the DMS among Jamaican weightlifters. Current findings support the 2-factor structure model previously observed among other populations [35, 36, 59] along with adequate internal consistency. In addition, there was evidence for convergent validity of the DMS using the BASS and the DASS-21.

In the current study, consistent with previous findings, a re-specified model of the DMS presented the best fit [35, 36, 59]. In addition, the final model was found to be invariant between urban and rural participants. This suggests that regardless of the area of origin, the model structure, the magnitude of the factor loadings, and the item intercepts remained consistent. Also, participants from the current study scored higher than participants from previous validations [36, 59]; however, this difference may be due to the difference in sample characteristics, as the present sample consisted of weightlifters and not university students, as with the other validation studies. Studies have shown that in comparison to other populations, weightlifters demonstrate a higher desire for leanness and muscularity and are more likely to engage in maladaptive behaviors to accomplish such ideals. These muscle-oriented concerns have also been linked to muscle dysmorphia [5, 10].

Consistent with previous validations of the DMS, adequate levels of internal consistency were observed for the two subscales and total score [35, 36, 59]. In terms of construct validity, the drive for muscularity is theoretically expected to be positively associated with body dissatisfaction. In line with this hypothesis, body dissatisfaction was found to be positively associated with the DMS, providing evidence for concurrent validity. In particular, concerns amongst all body areas captured by the BASS (hair excepted) presented significant positive correlations with muscularity-oriented body image attitudes (DMS-MBI). Higher correlations with muscularity concerns were observed for lower and upper torso, muscle tone and body weight. These correlations with muscularity are consistent with previous research which suggest that for men, contrary to what is observed among women, body dissatisfaction is generally associated with upper torso areas and insufficient muscle tone [5, 60]. Males may be internally driven to pursue the muscular ideal and strive for a more muscular appearance because of social, reproductive [8, 61] and economic benefits [25–28]. Unfortunately, weightlifters may be at an increased risk for muscle dysmorphia as evidenced by their high drive for muscularity [8]. Further, this becomes more disconcerting considering that there is evidence that this Afrocentric ethnic group is more likely to engage in more extreme strategies to achieve the muscular ideal [17, 18, 62].

There was no association between muscle-oriented behaviors (DMS-MB) and Body Areas Satisfaction. An explanation for the lack of association could be that muscularity behaviors associated with a drive for muscularity may be more likely to be influenced by factors other than body dissatisfaction. Perception of stress may be one of these factors as indicated by its weak association with muscularity behaviors.

Our findings indicate negative correlations between depression, anxiety and stress (DASS-21) and the drive for muscularity (DMS) for both subscales (DMS-MB and DMS-MBI). Though the present findings are consistent with some studies [4, 8] within this sample, the finding of higher levels of the drive for muscularity being associated with lower levels of depression, anxiety and stress may be due to the following four factors. First, one study has found that psychopathologies such as depression and eating disorders mediate the drive for muscularity and similar to our findings, also found an inverse relationship between depression and the drive from muscularity [4]. Theoretically, a possible explanation for the inverse relationship between the DMS and anxiety and depression is that by investing considerable amount of emotional and cognitive energy into the drive for muscularity, this may give short-term relief from symptoms such as depression, anxiety and stress. Second, it is possible that items on the DASS-21 may not be interpreted the same way in other populations. For instance, one recent study that was conducted in lower- and middle-income countries showed that on a scale which screened for depression, the endorsement of depressive affect only identified depression for females and not for males [63]. Third, research has shown that males are less likely to report psychological symptoms and seek mental health services [64] for fear of stigmatization [65]. Fourth, in Jamaica, not only is there a longstanding stigma related to mental illness [66] but also

admitting to psychological disturbances may violate the prevailing conceptions of masculinity.

This study has some limitations despite its contribution. First, only male weightlifters from a limited geographic region in Jamaica were considered, which, therefore, affects generalizability of these findings. Second, including other scales that measure eating pathology may have been beneficial in determining construct validity. Third, this study did not utilize a strict measure to classify rural and urban settings. As such, self-report of one's area of residence may have been biased by subjective perception, affecting the validity of these reports.

In conclusion, assessing the applicability of the drive for muscularity in the Jamaican context is necessary, especially considering that there is evidence of body dissatisfaction among Jamaican adolescent males [12–14]. Moreover, these findings are of concern, as research has suggested that the drive for muscularity in Black and Asian populations is likely to lead to more extreme strategies to achieve the muscular ideal than it is in white populations [17, 18, 63, 67]. The fact that we found the DMS to be a valid instrument in evaluating the drive for muscularity in Jamaican weightlifters is a first step in being able to accurately identify at risk groups. The availability of the present findings may contribute to results from previous findings in Jamaican men [12]. These findings further inform future research, diagnosis and treatment of negative outcomes associated with the drive for muscularity such as, negative body image, disordered eating, anabolic steroid use and muscle dysmorphia [11].

What is already known on this subject?

There is evidence that the drive for muscularity, popular in Western societies, has also infiltrated non-Western borders. Local data in Jamaica confirm a desire for a more muscular physique among Jamaican adolescent males along with associated negative health outcomes. Research also indicates that male weightlifters are at an increased risk for the drive for muscularity. Considering the negative health outcomes associated with the drive for muscularity, an accurate and reliable scale is warranted. The DMS has been widely used to study male body image concerns and has been found to have good psychometric properties.

What does this study add?

Few studies have examined the psychometric properties of the DMS among men from various racial and ethnic groups and many have encouraged further exploration of its psychometric properties among other more diverse groups of males. As such, our knowledge of the relevance and utility of the DMS remains limited. Of concern are males, especially in developing countries such as the Caribbean, where emphasis is placed on the traditional role of masculinity and in which an increased demonstration of manhood, whether through visual signs of strength (muscle) or prowess (multiple sexual partners) aids in compensating for low socio-economic standing. This study supports the need for a valid instrument for assessing the drive for muscularity in Jamaican males. It adds evidence of the suitability of the DMS in evaluating muscularity-related attitudes and behaviours among Jamaican male weightlifters. This tool can aid in early detection and help to stem any negative outcomes associated with the drive for muscularity and to plan future interventions.

Compliance with ethical standards

Conflict of interest The authors declare that there is no conflict of interest.

Ethical approval This research study was approved by the University of the West Indies/University Hospital of the West Indies/Faculty of Medical Sciences UWI/UHWI/FMS Ethics Committee. All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee and/or national research committee and with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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