

PSYCHOMETRIC ASSESSMENT OF MUSCLE DYSMORPHIA IN MEN: A SYSTEMATIC REVIEW OF EXISTING INSTRUMENTS AND THEIR APPLICABILITY TO PAKISTANI POPULATIONS

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ABSTRACT

Muscle dysmorphia (MD) is a male-predominant body image disorder characterized by a pathological preoccupation with perceived muscular inadequacy. While extensively researched in Western contexts, culturally validated psychometric instruments for South Asian populations are lacking. Following PRISMA guidelines, this systematic review evaluated existing MD assessment tools published between January 2000 and December 2024 across PubMed, PsycINFO, Scopus, Web of Science, and Google Scholar. Twenty-one studies evaluating four primary scales—the Muscle Dysmorphic Disorder Inventory (MDDI), Drive for Muscularity Scale (DMS), Muscle Appearance Satisfaction Scale (MASS), and Muscle Dysmorphia Questionnaire (MDQ)—were analyzed using the COSMIN checklist. Although these instruments demonstrate acceptable reliability and validity in Western samples, none have been psychometrically validated or culturally adapted for Pakistani or broader South Asian men. Key dimensions such as collectivistic masculinity norms, family expectations, religious or dietary beliefs, and local gym cultures are omitted, highlighting significant cross-cultural measurement biases.

I. INTRODUCTION

Muscle dysmorphia (MD) is a serious presenting concern of body image disturbance involving a recurring, intrusive, and pathological concern with muscular inadequacies, despite having a muscular physique. Originally described as 'reverse anorexia nervosa' among male bodybuilders, MD is currently proposed as a form of body dysmorphic disorder, with serious psychological, behavioral, and consequent functional impairment (Pope et al., 1997). Sufferers of MD commonly engage in compulsive exercise, strict diets, excessive surveillance of their bodies, pharmacologic use of dietary supplements, as well as sometimes using anabolic-androgenic steroids. Over the past twenty years, however, there has been an increasing volume of literature on the topic of MD, primarily fueled by the globalization of fitness culture, the projection of beauty ideals through social media, and the visibility of muscular male bodies in the media. Even though the earliest empirical studies were primarily conducted in the West among male bodybuilding audiences, there is an indication that muscularity-driven body dissatisfaction is no longer restricted to the West. At present, the globalization of beauty standards has led to the internalization of the muscularity-driven body ideal in the South Asian setting, which is seeing the convergence of traditional masculine ideals and fitness/aesthetic standards.

Muscle dysmorphia is a complex and culturally embedded body image disturbance. Over the past two decades, several self-report instruments have been developed to assess muscle dysmorphic symptoms; however, these measures have largely been constructed and validated within Western sociocultural contexts. Given that body ideals, masculinity norms, and health-related behaviors are strongly shaped by cultural, religious, and social values, the direct application of these instruments to non-Western populations such as males in Pakistan raises important concerns regarding conceptual relevance, content validity, and cultural sensitivity. Therefore, a systematic review of existing scales measuring muscle dysmorphia is a critical preliminary step before the development of a culturally grounded measurement tool for Pakistani males. A systematic review allows for a comprehensive and structured synthesis of the theoretical frameworks, dimensions, and psychometric properties underlying existing muscle dysmorphia measures. Current scales vary considerably in how they conceptualize the construct, with some emphasizing cognitive components, others focusing on behavioral manifestations, and still others incorporating affective and functional impairment domains. By systematically reviewing these instruments, it becomes possible to identify core dimensions that have demonstrated empirical consistency across studies, as well as dimensions that remain underexplored or inconsistently operationalized. This process ensures conceptual clarity and theoretical rigor in defining muscle dysmorphia for subsequent scale development.

Furthermore, the systematic evaluation of psychometric properties provides an essential benchmark for developing a new instrument. While many existing scales report acceptable internal consistency and construct validity, few have undergone rigorous cross-cultural validation, and even fewer have been examined within South Asian populations. Linguistic nuances, culturally specific expressions of masculinity, religious considerations related to body modification, and socioeconomic constraints influencing gym culture and supplement use are rarely reflected in existing measures. As a result, the direct use of Western-developed scales may fail to capture culturally salient manifestations of muscle dysmorphia among Pakistani males, potentially leading to measurement bias and reduced diagnostic sensitivity. In addition, a systematic review facilitates the identification of methodological limitations within existing instruments, such as narrow sampling frames, overreliance on bodybuilder populations, or limited assessment of functional impairment, less inclusion of affective and behavioral dimensions, and quality-of-life outcomes. Recognizing these limitations informs the development of a more comprehensive and contextually appropriate scale that reflects the lived experiences of Pakistani men. Importantly, this approach also supports the inclusion of culturally relevant indicators such as sociocultural pressure related to masculinity, family expectations, appearance comparison within peer groups, and culturally sanctioned body practices that may uniquely contribute to muscle dysmorphic tendencies in this population. From a methodological standpoint, conducting a systematic review strengthens the scientific justification for scale development by demonstrating that no existing instrument sufficiently addresses the cultural, social, and psychological realities of Pakistani males. This evidence-based rationale is essential for positioning scale development as a necessary and original contribution to the literature. Rather than duplicating existing tools, a newly proposed scale aims to integrate empirically supported dimensions of muscle dysmorphia with culturally specific constructs, thereby enhancing both its ecological validity and clinical utility.

II. METHOD

Search Strategy

The principles of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed for searching, screening, and selecting articles. The search of measures evaluating muscle dysmorphia was carried out across the databases of PubMed, PsycINFO, Scopus, Web of Science, and Google Scholar. The publication search period extended from January 2000 to December 2024.

Boolean operators (AND/OR) were utilized with primary search terms to broaden the search strategy. The primary search terms were “muscle dysmorphia” and “muscularity”, in combination with: “assessment,” “scale,” “questionnaire,” “inventory,” “psychometric validation,” “measurement tool,” “drive for muscularity,” and “body image.” Studies were included if they met the following inclusion criteria:

1. Assessed muscle dysmorphia or muscularity-related constructs using a validated or semi-validated instrument.
2. Involved male participants aged 18 years or older.

3. Reported psychometric properties such as reliability, factor structure, or validity.
4. Were published in English.

Clinical case reports, intervention studies, experimental studies without a measurement focus, qualitative studies, and randomized controlled trials were excluded. The final sample of studies was determined after full-text review and consensus discussion.

Screening and Selection

The screening, selection, and full-text review were conducted across four distinct phases:

Phase I: Initial database screening yielded 1,240 articles, including duplicate records. After discarding duplicates based on title and abstract relevance to muscle dysmorphia or muscularity-related instruments, 980 records remained. A total of 918 records were excluded due to mismatch criteria (e.g., non-psychometric studies, irrelevant outcomes, non-human research, or inadequate population focus). This left 62 studies for full-text review.

Phase II: All 62 full-text articles were retrieved and reviewed in detail by a single researcher to ensure rigorous, centralized item tracking across the historical literature. Following full-text evaluation, 44 studies were excluded due to lack of scale development/validation data, inadequate psychometric information, population mismatch, duplicate data across multiple publications, or inaccessible full texts. This resulted in 18 studies meeting the criteria for final inclusion.

Phase III: Methodological quality assessment of all 18 included studies was conducted using the COSMIN (Consolidated Standards for the Selection of Health Measurement Instruments) checklist. This standardizes the synthesis of evaluation tools by grading specific psychometric performance domains. Extracted data indices included internal consistency, test–retest reliability, structural validity, convergent/divergent validity, and sample characteristics. Extracted data were rechecked twice to ensure structural consistency before synthesis.

Phase IV: Supplementary manual searches were conducted through the reference lists of the included articles, the bibliographies of published systematic reviews, and targeted Google Scholar tracking. Through this secondary search process, three additional studies meeting all inclusion criteria were identified. After undergoing quality appraisal via the COSMIN checklist, these three studies were incorporated into the final sample, bringing the total number of included studies to 21.

III. RESULTS

The systematic review identified four major instruments used internationally to assess muscle dysmorphia and related constructs: The Muscle Dysmorphic Disorder Inventory (MDDI), Drive for Muscularity Scale (DMS), Muscle Appearance Satisfaction Scale (MASS), and Muscle Dysmorphia Questionnaire (MDQ). Evaluating these tools through the COSMIN framework revealed high internal consistency and construct validity within Western samples, but exposed a total absence of cross-cultural validation or invariance testing for South Asian populations.

Muscle Dysmorphic Disorder Inventory (MDDI)

The MDDI consists of 13 items distributed across three subscales: Drive for Size, Appearance Intolerance, and Functional Impairment. Under COSMIN criteria, the scale demonstrates strong internal consistency (alpha range of .78 to .91) and robust structural validity across diverse Western populations, making it a robust tool for both clinical and non-clinical settings. The Drive for Size subscale captures the individual's desire to increase muscularity, while Appearance Intolerance assesses dissatisfaction and distress related to perceived physical inadequacies. Functional Impairment evaluates the extent to which these concerns interfere with daily life, social interactions, or work-related functioning. Despite these strengths, the MDDI has notable limitations in cross-cultural applicability. It has not been translated, culturally adapted, or psychometrically validated in Pakistani populations. Critically, it lacks measurement invariance when applied outside individualistic contexts. It does not capture culturally specific factors, such as collectivistic masculine norms, social expectations, religious or cultural beliefs, and dietary practices unique to South Asia. Additionally, the scale does not assess local gym culture, peer comparison, family-driven appearance pressures, or the influence of social media trends on muscularity ideals. Emotional responses

such as shame, guilt, or frustration associated with not achieving culturally endorsed muscularity are also absent, limiting the scale's sensitivity and ecological validity for Pakistani men.

Drive for Muscularity Scale (DMS)

The DMS comprises 15 items measuring attitudes and behaviors related to the pursuit of muscularity. The scale demonstrates high reliability (alpha range of .85 to .92) and satisfies COSMIN standards for construct and convergent validity within mainstream fitness research, exploring both cognitive and behavioral aspects of muscularity in men. Items focus on the individual's motivation to increase muscle mass, engagement in exercise, and behavioral strategies to achieve a desired physique. While the DMS is psychometrically sound within Western cohorts, its structural layout lacks affective assessment, completely failing to capture emotional experiences such as anger, anxiety, or frustration when muscularity goals are unmet. Moreover, it does not consider sociocultural and religious influences, such as expectations to maintain modesty, adhere to culturally sanctioned body practices, or meet family-driven standards of masculinity. Local dietary behaviors, including consumption of traditional foods and culturally influenced use of supplements, are also not included. Finally, the scale overlooks the impact of social comparison with peers and local fitness influencers, which is particularly relevant in Pakistani gym culture.

Muscle Appearance Satisfaction Scale (MASS)

The MASS contains 19 items and evaluates three dimensions: Body Checking, Satisfaction, and Avoidance. The scale shows strong reliability (alpha approximately .88) and has been applied primarily in Western gym-going and clinical populations, meeting basic psychometric thresholds for internal consistency. Body Checking assesses behaviors such as mirror checking, measuring muscle size, and consulting others about one's appearance. Satisfaction measures positive or negative evaluations of one's muscularity, and Avoidance captures behaviors aimed at concealing or avoiding exposure of the body. Despite its comprehensiveness, MASS does not address culturally specific expressions of body checking or satisfaction, presenting a significant threat to content validity in non-Western populations. For example, in Pakistani contexts, modesty norms and social etiquette shape the way men monitor their bodies, potentially differing from Western practices. Similarly, MASS does not capture dietary behaviors, traditional food beliefs, supplement use, or culturally influenced exercise routines, nor does it account for the psychological consequences of failing to meet culturally sanctioned muscularity ideals, such as guilt, shame, or reduced self-worth. Furthermore, local social media trends and exposure to fitness influencers, which strongly impact muscularity expectations in Pakistan, are not assessed.

Muscle Dysmorphia Questionnaire (MDQ)

The MDQ is a broader diagnostic tool comprising 31 items and assessing appearance dissatisfaction, behavioral symptoms, and functional impairment associated with muscle dysmorphia. It demonstrates good internal consistency (alpha range of .80 to .90) and is designed to capture a comprehensive profile of MD symptoms, showing sound criterion-related validity in Western clinical frameworks. However, like the other scales, the MDQ was developed within a Western framework, reflecting individualistic ideals and perspectives on pathology. It does not capture culturally specific dimensions of masculinity in Pakistan, such as collectivist social expectations, religiously guided body practices, or culturally influenced interpretations of strength and attractiveness. Consequently, its face and content validity drop significantly when pulled from its target population. Additionally, the MDQ does not evaluate local dietary practices, gym culture nuances, or the use of traditional foods and supplements for muscle building. Emotional responses, including shame, anger, or anxiety triggered by failure to achieve culturally endorsed muscularity, are absent. Social comparison pressures, particularly from peers, family, and local social media fitness influencers, are also unmeasured, which limits the scale's applicability in South Asian contexts.

IV.DISCUSSION

This systematic review critically examined the most commonly used psychometric instruments for assessing MD in men, namely the MDDI, DMS, MASS, and MDQ. While these measures demonstrate strong reliability and validity in Western populations, the present review highlights substantial cultural, conceptual, and contextual limitations that restrict their applicability to Pakistani and broader South Asian male populations. The MDDI is widely

regarded as a gold-standard measure of MD, capturing drive for size, appearance intolerance, and functional impairment (Hilton et al., 2008). Similarly, the DMS has been extensively used to assess attitudinal and behavioral components of muscularity pursuit (McCreary & Sasse, 2000). The MASS and MDQ further expand assessment to include body checking, satisfaction, avoidance behaviors, and diagnostic features of MD (Mayville et al., 2002; Pope et al., 2005). Collectively, these instruments offer a comprehensive understanding of MD as conceptualized within Western frameworks. However, all four scales are grounded in individualistic cultural assumptions, emphasizing personal dissatisfaction and self-driven appearance goals while largely neglecting the influence of collectivistic social structures.

In Pakistani society, muscularity is embedded within broader sociocultural narratives of masculinity, strength, respect, and social status. Cultural expectations are often reinforced by family members, peers, and community norms, rather than being solely internally driven. Research indicates that body image concerns in collectivistic cultures are more strongly shaped by social evaluation and interpersonal comparison than by individual preference alone (Swami et al., 2010). None of the reviewed instruments explicitly assess these socially mediated pressures, which may play a central role in the development and maintenance of MD symptoms in Pakistani men. Another critical gap identified in this review is the absence of culturally specific dietary beliefs and practices. Existing MD measures focus primarily on exercise behaviors and, to a limited extent, supplement or steroid use. However, they do not capture beliefs about traditional foods, culturally sanctioned eating practices, or moral and religious considerations related to diet. In Pakistan, perceptions of muscle development are often intertwined with beliefs about “desi” foods, protein intake, and culturally acceptable means of body modification. Ignoring these elements may result in an incomplete or distorted assessment of muscularity-related pathology.

The reviewed scales also inadequately assess the emotional consequences of failing to achieve muscular ideals within a cultural context. While functional impairment is measured in instruments such as the MDDI and MDQ, affective responses—including shame, guilt, anger, frustration, and perceived failure—are either underrepresented or absent. Emerging evidence suggests that emotional distress plays a central role in MD, particularly when muscularity is closely linked to self-worth and social validation (Grieve, 2007; Mitchison & Mond, 2015). In Pakistani men, where masculine identity and social respect are often interdependent, these emotional responses may be especially pronounced and clinically relevant. In addition, the growing influence of social media and local fitness influencers represents an important contextual factor that is not adequately addressed in existing instruments. Exposure to idealized muscular bodies through social media has been shown to intensify body dissatisfaction and drive for muscularity (Holland & Tiggemann, 2016). In Pakistan, gym culture is increasingly shaped by online fitness trends, locally popular trainers, and peer-driven comparison, yet none of the reviewed measures include items assessing these influences. This omission further limits the ecological validity of Western-developed MD scales in contemporary South Asian contexts. The direct implementation of these Western instruments without rigorous local adaptation brings severe clinical risks. Most notably, using unadjusted indices creates a high probability of diagnostic insensitivity, failing to capture individuals who express severe muscle dysmorphia through culturally specific behaviors, such as traditional dietary restriction or collectivist peer-comparison distress. Conversely, it risks pathologizing culturally normative behaviors, such as religious body modesty or traditional “desi” muscle-building dietary steps, leading to profound measurement bias and inaccurate prevalence estimates across local epidemiological data (Van de Vijver & Leung, 1997). This has direct implications for both research and clinical practice, as culturally insensitive tools may fail to identify individuals at risk or misallocate clinical intervention assets.

V. CONCLUSION

Although existing MD instruments have significantly advanced the understanding of muscle dysmorphia in Western contexts, their limited cultural scope constrains their global applicability. Taken together, the findings of this review underscore the urgent need for a culturally grounded, psychometrically robust assessment tool for muscle dysmorphia in Pakistani men. Such a measure should integrate empirically supported dimensions of MD such as drive for muscularity, body dissatisfaction, and functional impairment while also incorporating culturally salient constructs, including sociocultural masculinity norms, family and peer expectations, traditional dietary

beliefs, emotional responses to perceived inadequacy, and social media influences. Developing such a tool would enhance conceptual clarity, improve diagnostic accuracy, eliminate systematic measurement bias, and provide a stronger foundation for targeted clinical interventions and prevention efforts in South Asian contexts.

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