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Intervention Development for People with Muscle Dysmorphia Symptoms: Best Practice and Future Recommendations

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ABSTRACT

Symptoms of muscle dysmorphia carry significant risks for people's health and wellbeing. A key priority is therefore to support this group in reducing their symptoms and distorted behaviors to mitigate against the development of clinically severe muscle dysmorphia. However, few interventions exist and there is a need to develop new programs urgently. In this article, we provide researchers and practitioners with evidence-based recommendations on how to effectively achieve this. Recommendations are based on the health intervention development literature and the *Intervention Mapping Protocol* is introduced as a valuable tool for systemizing the development process. We encourage and now call on researchers and practitioners to action this imminent and important task of developing interventions to address muscle dysmorphia symptoms.

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Muscle dysmorphia is characterized by a pathological belief that one is insufficiently muscular, and the disorder is currently classified in the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) as a specifier for body dysmorphic disorder (American Psychiatric Association, 2013). Literature has shown that symptoms common to the disorder include a distorted body image, obsession with muscle mass, size and leanness, fixation on body image, anxiety and stress (Sandgren & Lavalley, 2018), excessive and compulsive exercise/weight-training (Martenstyn et al., 2022). Both men and women experience these symptoms, yet males typically report higher levels of symptomatology (e.g., Lechner et al., 2019). Some anecdotal reports suggest clinicians are experiencing an increasing number of men presenting with the disorder (Griffiths & Murray, 2018), and recent empirical research suggests muscle dysmorphia is also increasingly common in adolescent boys

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and girls (e.g., Mitchison et al., 2021). Importantly, exact prevalence numbers are lacking due to methodological issues, such as the absence of clinical cut-off scores on screening measures (Tod et al., 2016). Moreover, although muscle dysmorphia has primarily been studied in Western countries (Tod et al., 2016), there is now an increase in research reporting the prevalence of muscle dysmorphia symptoms in Non-Western countries, such as China, Pakistan and Indonesia (e.g., He et al., 2021; Sarfarz et al., 2020; Susanto et al., 2020). This suggests muscle dysmorphia is a growing, global mental health concern, and the research conducted to date provides a platform for future epidemiological research designed to inform evidence-based and participant-centered interventions.

The development of muscle dysmorphia symptoms is complex, and further research is needed to confirm the causal risk factors for the disorder. Nevertheless, empirical research has identified several, potential risk factors. For example, most recent research suggests that preexisting perfectionistic attitudes (e.g., Dryer et al., 2016), vulnerable narcissism (e.g., Boulter & Sandgren, 2022), conformity to specific masculine norms (e.g., Grunewald et al., 2022), social media addiction and eating disturbances (e.g., Imperatori et al., 2022), parental control, authority and resentment (e.g., Olave et al., 2021; Pace et al., 2020) and other relational victimization such as the father-child object relation (e.g., Wooldridge, 2022) may all contribute to the development of muscle dysmorphia. Importantly, it is evident from the literature that muscle dysmorphia symptoms (e.g., excessive weight training, fixation on body image) carry significant risks for people's health and wellbeing (Sandgren & Lavallee, 2018). For example, functional impairment (e.g., feeling unable to carry out certain functions in their daily lives), body dissatisfaction (e.g., strong discomfort with one's appearance resulting in symptoms of anxiety and depression), and suicidal ideation (Ortiz et al., 2021). Muscle dysmorphia is also linked with the development of behaviors associated with other, serious psychological and physiological health consequences (e.g., abusing anabolic-androgenic steroids; Harris et al., 2019). A key priority should therefore be to support people with muscle dysmorphia in reducing their symptoms. However, this area of research is still largely underdeveloped and poorly understood. This calls for future research.

Although several interventions and treatment options are on offer for people with body dysmorphic disorder (Krebs et al., 2017), it is unclear whether these are effective for people with muscle dysmorphia, or if people with muscle dysmorphia seek out current interventions and treatment options for body dysmorphic disorder. This lack of clarity highlights the need to further investigate the development and maintenance of muscle dysmorphia, which in turn, should lead to new and improved interventions

(e.g., Krebs et al., 2017). Additionally, based on the extant literature, interventions that specifically target muscle dysmorphia are rarely developed and evaluated (Leone et al., 2005; Tod et al., 2016). Additionally, compulsive exercise is one characteristic of muscle dysmorphia and a recent systematic review of studies treating compulsive exercise in eating disorders or muscle dysmorphia found that none of the 18 included studies sampled people with muscle dysmorphia (Martenstyn et al., 2022). Consequently, there is a need to carefully develop and evaluate future interventions for people with symptoms of muscle dysmorphia, and early intervention is particularly important to prevent symptoms from worsening. The purpose of this article is to encourage future intervention development work in this area and provide researchers and practitioners with evidence-based recommendations on how to effectively achieve this. In this article, we focus on the early stages of development where a lot of groundwork is typically needed. We feel this is most appropriate given the current status on muscle dysmorphia research.

Current interventions for muscle dysmorphia

From the available evidence-base, it appears that only two published, peer-reviewed studies have delivered and evaluated an intervention with the primary aim of targeting muscle dysmorphia. However, details of development are lacking. Outar et al. (2021) developed an intervention comprising of rational emotive behavior therapy and cognitive behavioral therapy, and results suggested that symptoms were reduced post-intervention. Although positive, only two males and two females with high levels of self-reported muscle dysmorphia symptoms were recruited to the study. Murray and Griffiths (2015) also evaluated an eating disorder-focused, family-based intervention with only one adolescent male meeting full diagnostic criteria for muscle dysmorphia. Results suggested a decrease in symptoms. Indeed, there is a high rate of diagnostic cross-over between eating disorders and muscle dysmorphia (Badenes-Ribera et al., 2019), so it is plausible that many of the therapeutic approaches and techniques adopted in eating disorder interventions (e.g., cognitive behavioral therapy) will also work well in interventions targeting muscle dysmorphia. It is beyond the scope of this article to argue for, or recommend, specific therapeutic and psychological approaches or techniques to adopt in future muscle dysmorphia interventions. Additional, different interventions testing various therapies and techniques in larger, randomized controlled trials with the target group are first needed to make such assumptions.

Of significant importance, there are other, more critical steps that should be taken by future intervention developers prior to making decisions on the

type of therapy to adopt and commencing larger-scale intervention testing. These initial steps involve being clear about which principles inform the entire intervention development process and attempting to make this process as systematic and manageable as possible. This approach is vital because it allows researchers to make early assumptions about expected acceptability and potential efficacy. Drawing on the health intervention development literature, the potential usefulness in adopting an approach and following a protocol/framework (in this case, the Intervention Mapping Protocol) to aid the development of a future muscle dysmorphia intervention is introduced below.

Adopting an approach

Interventions for muscle dysmorphia are health interventions by nature. The World Health Organization's (2020) International Classification of Health Interventions defines an intervention as "an act performed for, with or on behalf of a person or population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions." These interventions are complex, and the process of development can be challenging. Intervention development refers to the whole process of identifying, collecting, developing, reviewing, refining, and optimizing intervention materials and delivery mechanisms (Craig et al., 2008). Therefore, this process should not be taken frivolously. In the health intervention domain, developers often adopt an endorsed approach to intervention development to assist with the process and help with recognizing key principles to be considered throughout the development phase (e.g., evidence, participant views; O'Cathain et al., 2019). Answering *why* an intervention for muscle dysmorphia is needed now and reflecting on which values should inform the intervention can help with deciding on which approach to adopt. We list below some examples of why a participant-centered and evidence-based approach may hold value when developing future muscle dysmorphia interventions.

Because little is known about what type of intervention is preferred by, or acceptable to, people with muscle dysmorphia symptoms (e.g., Outar et al., 2021), it will be imperative to focus on considering the perspectives and experiences of the target group (i.e., a participant-centered approach; O'Cathain et al., 2019). Doing so will help to tailor the intervention to the target populations' psychological and social context (Bartholomew et al., 2011) and make sure the intervention matches participants' preferences for intervention format and delivery. For example, should early intervention initiatives be implemented in the environment that serves as a social framework for muscularity-oriented behaviors and attitudes (i.e., gyms and

fitness centers)? Adopting a participant-centered approach will aid the accumulation of data to help answer such questions and back up the decisions made. Additionally, because few muscle dysmorphia interventions have been developed and evaluated, and there is limited knowledge about what type of treatment or therapeutic techniques are most effective with this group of participants, there may be substantial value in grounding future muscle dysmorphia intervention components in empirical evidence (i.e., an evidence-based approach; O’Cathain et al., 2019). Evidence-based decisions used in future muscle dysmorphia interventions could, for example, be informed by those successfully used for treating body dysmorphic disorders (e.g., cognitive behavioral therapy; Krebs et al., 2017) or other mental health disorders closely related to muscle dysmorphia (e.g., eating disorders).

Furthermore, depending on the context and needs, approaches can also be combined, and previous health interventions which have combined a participant-centered and an evidence- and theory-based approach have demonstrated successful behavior change in participants across a variety of health settings (Bartholomew Eldridge et al., 2016). It is likely that by adopting a similar, combined approach, this will help maximize both the acceptability and potential efficacy of future muscle dysmorphia interventions. Researchers and practitioners wishing to take on the important task of developing interventions for people with muscle dysmorphia symptoms are recommended to decide on an approach in advance of beginning their development work. After deciding on an approach, researchers can decide on, and follow, a protocol/framework that endorses the approach taken to help make this process even more systematic and manageable.

Following protocols or frameworks

Within the health intervention development literature, protocols and frameworks serve as guidance tools to help intervention developers with the decision-making process and to address questions directly related to the context of their interventions. Some of the most frequently used for the development of participant-centered and evidence- and theory-based health interventions include Behavior Change Wheel (Michie et al., 2014), Intervention Mapping Protocol (Bartholomew Eldridge et al., 2016), and Theoretical Domains Framework (French et al., 2012). There are many similarities between these, but they differ in their strengths and limitations (O’Cathain et al., 2019). The six guiding questions outlined by O’Cathain et al. (2019) can further help with deciding which protocol or framework is the best fit for the development of a novel intervention to address muscle dysmorphia symptoms: (1) What is the intention of the new intervention?

(2) What is the context of the intervention? (3) What values inform the development? (4) What skills and experience do the research team have? (5) Which approaches have resulted in interventions shown to be effective? and (6) What resources are available for the intervention development? After choosing a protocol or framework to follow/consult, intervention developers can commence their development work with clear guidance on how and when to achieve different tasks related to their intervention, to preserve progress during this demanding process.

The Intervention Mapping Protocol is rigorous, comprehensive, and has been extensively used previously for the development of successful health interventions (Bartholomew Eldridge et al., 2016), such as reducing eating disorder symptoms in athletes (Sandgren, Haycraft, Arcelus, et al., 2022). The protocol has yet to be adopted for the development of a muscle dysmorphia intervention and we will now illustrate how the Intervention Mapping Protocol, as an example, can serve as a useful guidance tool for intervention development for people with muscle dysmorphia symptoms.

Intervention mapping

Intervention Mapping consists of six steps with several tasks for intervention developers to undertake and evaluate (Bartholomew Eldridge et al., 2016): (1) needs assessment and logic model of problem, (2) logic model of change, (3) intervention design, (4) intervention production, (5) implementation plan, and (6) evaluation plan. In the present article, we focus on the first two steps of the protocol: conducting a needs assessment to inform the intervention and creating logic models to identify targets and change methods.

Conducting a needs assessment to inform the intervention

The first step of Intervention Mapping is to conduct a needs assessment where the research team (intervention development team) collect and review existing evidence, as well as collect any new data where evidence is lacking (i.e., what evidence is already known and what other evidence would be useful to know to inform the intervention?). Researchers should begin by fully analyzing muscle dysmorphia and its multiple causes. Importantly, literature has highlighted potential challenges with recruiting people with muscle dysmorphia to psychological interventions (e.g., Martenstyn et al., 2022; Outar et al., 2021). One key, first step of a needs assessment should therefore be to explore the causes for this and test different recruitment strategies to identify the most appropriate and effective methods.

Additionally, due to the paucity of research around muscle dysmorphia interventions, there is a need to explore the prerequisites and intervention

preferences of people with muscle dysmorphia symptoms. Similar to previous athlete eating disorder research (e.g., Kroshus et al., 2014; Sandgren, Haycraft, Pearce, et al., 2022), there may also be value in gathering the views of key stakeholders who are likely to encounter individuals with muscle dysmorphia symptoms (e.g., personal trainers, psychologists, other health professionals, parents and peers) as they may have some useful insight into the best ways to support those at risk. Doing this, the needs assessment ensures evidence is available to make decisions around the format, delivery and dosage of the intervention, which are informed by people with muscle dysmorphia symptoms and any relevant key stakeholders. This should help to increase acceptability and possibly also, adherence (Bartholomew Eldridge et al., 2016). Conducting a needs assessment requires significant resources, and the research team should therefore consider any resource or time constraints and plan their assessment(s) accordingly. Establishing a collaborative working group with different responsibilities may help to overcome any resource and time constraints.

Creating logic models to identify targets and change methods

The second step of Intervention Mapping involves creating one logic model of the problem and one logic model of change based on evidence from the literature and the needs assessment (Bartholomew Eldridge et al., 2016). The logic model of the problem seeks to identify the causes of muscle dysmorphia in individuals and is intended to help the researchers better understand the nature of the disorder (i.e., identifying personal and environmental determinants for developing muscle dysmorphia symptoms, maintenance factors, behavioral and environmental outcomes of the identified determinants, and the impact that the disorder can have on an individual's quality of life). In turn, the model can help to identify targets for intervention and behavioral change. To illustrate, the model can, for example, identify that many individuals with muscle dysmorphia symptoms have low motivation toward starting in-person therapy (personal determinant) due to secrecy, being in denial and lack of openness (e.g., Pope et al., 2005; Wooldridge, 2022). This could promote an avoidance of support-seeking behaviors (behavioral factor) and may drive the continuation of excessive and compulsive muscle-building behaviors and attitudes (health problem). If left untreated, symptoms will ultimately affect the overall quality of life and health, such as experiences of functional impairment, body dissatisfaction and suicidal ideation (Ortiz et al., 2021). The logic model of problem should consider multiple personal and environmental determinants in the analysis.

After creating a logic model of the problem, the task is to propose solutions to address the determinants (targets) identified. This logic model focuses on identifying what will change and the methods for achieving this. This, in turn, helps to ensure the intervention is suitably targeted and equipped with appropriate change methods (Bartholomew Eldridge et al., 2016). For example, to address concerns with existing support options for muscle dysmorphia (e.g., in-person therapy), individuals are provided with support that enables them to work independently or together with a professional to enhance knowledge, self-efficacy/esteem, and own decision-making (performance objectives). This can be facilitated by presenting full and honest descriptions of muscle dysmorphia symptoms and potential consequences of the disorder, and by emphasizing the benefits of change and the disadvantages of not making any changes (change objectives). Accordingly, this may improve the individuals' level of openness and motivation toward making change (behavioral outcome), and therefore reduce symptoms. The logic model of change should identify appropriate performance and change objectives for every personal and environmental determinant identified in the logic model of problem.

Following on from conducting a needs assessment and creating logic models, there are several, other important steps of Intervention Mapping involved in the development process. For example, generating and developing intervention themes, components, scope and sequence, and pilot testing, refining and producing intervention materials (Bartholomew Eldridge et al., 2016). Findings from the needs assessment and logic models will assist the research team in every step for the remainder of this process and until the intervention is developed and ready for evaluation. In line with health intervention guidelines, this initial evaluation should focus on assessing the feasibility, acceptability and potential efficacy (e.g., can the intervention work, and if so, how?; Tickle-Degnen, 2013). Only then, and depending on initial findings, is it worthwhile to invest in larger, more definitive trials.

Summary

There is an urgent need to develop interventions to support individuals with symptoms of muscle dysmorphia. If delayed any further, many people with these symptoms will not receive intervention early enough, which in turn is likely to cause symptoms to worsen. The process of development is complex and should be treated as a longer-term initiative; however, consulting available evidence and guidelines from the health intervention development literature can help make this process more manageable. We have highlighted best practices to intervention

development, drawing on established guidelines from the health intervention development literature, and illustrated the potential usefulness in adopting a participant-centered and evidence-based approach for the development of a future muscle dysmorphia intervention. Following/consulting an existing protocol or framework (e.g., Intervention Mapping) should help make this process more achievable. Conducting a thorough needs assessment and creating logic models will require significant resources and research efforts, but in turn this work will hopefully leave researchers with a strong evidence base and infrastructure for making appropriate, evidence-based decisions when developing interventions. This should help maximize the interventions' acceptability and effectiveness. Lastly, we hope that this article will spark further inquiry on the topic and serve as meaningful guidance for researchers and practitioners wishing to take on the pivotal task of developing muscle dysmorphia interventions.

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Author contributions

The authors contributed equally to the conceptualization and investigation of this work, and writing, reviewing, and editing the manuscript. All authors have read and approved the submitted manuscript.

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No potential conflict of interest was reported by the author(s).

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