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Research Paper

Exploring health and exercise professionals' views on muscle dysmorphia in the Norwegian population

Lena Langeland, Sebastian S. Sandgren*

Department of Education and Sports Science, University of Stavanger, Stavanger, Norway

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ABSTRACT

Objective: Symptoms of muscle dysmorphia (MD) are prevalent among males who engage in weight training. If symptoms remain undetected and untreated, it can impair their health and wellbeing. Research indicates that men are reluctant to seek professional help on their own, and there is a lack of intervention options for people with MD symptoms. Health and exercise professionals' competence and perspectives may offer important knowledge around the development of future interventions. However, research has yet to do so. This study therefore aimed to explore health and exercise professionals' views and perspectives on MD in the Norwegian population.

Method: Semi-structured interviews were conducted with seven health and exercise professionals to discuss their knowledge and experiences with MD, and their views on prevention measures and interventions.

Results: Thematic analysis identified three overarching themes: (1) MD symptomatology, including experiences with symptoms and consequences of MD, (2) challenges related to identifying MD symptoms, and (3) managing MD.

Conclusion: Symptoms of MD were described by participants to be severe and complex yet challenging to identify among their clients/patients. There is a need to develop interventions aimed at reducing symptom development, as well as resources to assist health and exercise professionals in approaching individuals with MD symptoms.

1. Introduction

Muscle dysmorphia (MD) is a mental health disorder characterized by a significant concern about one's muscularity and the belief that one is insufficiently muscular (American Psychiatric Association [APA], 2013). The disorder is currently classified as a specifier for body dysmorphic disorder in the Diagnostic and Statistical Manual of Mental Health Disorders 5th Edition (DSM-5; APA, 2013). Symptoms of MD include excessive exercise and dieting to achieve bigger and more defined muscles, body dissatisfaction, distorted body image, anxiety and stress. Individuals with MD symptoms commonly have a perception of inadequate size, despite being very large and muscular (Pope et al., 2000). Functional impairment, difficulties in maintaining relationships, use of anabolic androgenic steroids (AAS), depression, and suicidal thoughts are frequently associated with symptoms of MD (APA, 2013). Recent research suggests a high prevalence of MD symptoms, particularly among young males who engage in weight training (e.g., Campagna & Bowsher, 2016; Mitchison et al., 2022). In addition, a study by Bozsik et al. (2018) suggests that also the female body ideal has

incorporated increased muscularity. Mitchison et al. (2022) revealed that the prevalence of MD among Australian adolescent boys and girls ($n = 3618$; age 14.8 ± 1.5) was 2.2 % and 1.4 %, respectively. Meinig-Bache (2019) reported a MD prevalence of 35 % for Norwegian males with a gym membership (age 24.2 ± 6.2). However, due to methodological issues such as invalid cut-off scores on screening measures, exact prevalence numbers are still lacking (Tod et al., 2016).

MD was first introduced by Pope et al. (1997), and in recent years there has been a notable growth in published research and a strong scientific interest in the area (Tod et al., 2016). However, to date there are no existing interventions that have been developed specifically for, or tested with, people with symptoms of MD (Sandgren & Lavalée, 2023). The effect of different intervention options is predominantly based on case studies and anecdotal evidence (Brown et al., 2017; Cunningham et al., 2017; Outar et al., 2021). In a recent paper, Sandgren and Lavalée (2023) argue for the need to develop early interventions for MD which are centered around participants' and stakeholders' needs and preferences. Moreover, causal risk factors need to be further identified and studied, however a history with eating disorder symptoms

* Correspondence author at: Department of Education and Sport Science, University of Stavanger, Stavanger, Norway.

E-mail address: sebastian.s.sandgren@uis.no (S.S. Sandgren).

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(Martensstyn et al., 2022), perfectionistic attitudes (Dryer et al., 2016), social-media addiction (Imperatori et al., 2022) or traumatic experiences such as bullying or abuse (Sandgren & Lavallee, 2018) can contribute to the development of MD symptoms. The development of MD symptoms is complex, and if symptoms are left untreated this can contribute to reduced health and wellbeing, along with psychological and physiological consequences (Ortiz et al., 2021). It is therefore imperative that people with MD symptoms are identified and supported in the early stages of symptom development to mitigate against symptoms worsening.

Of importance, it was recently reported that people with symptoms of MD is an underserved and underrecognized population (White et al., 2019) and there is a lack of empirical evidence concerning the degree of help-seeking in this population. However, college counselors and other health professionals (e.g., school nurses) have previously reported an increase in students with symptoms of MD (Davey & Bishop, 2006). Moreover, MD is challenging to identify, as the symptoms can be misinterpreted as healthy habits, or kept hidden due to taboo, stigma or fear of intervention (Tod et al., 2016). Some research also indicates that men rarely seek help on their own and may be reluctant to receive help (Sandgren & Lavallee, 2023). Additionally, research within the eating disorder health literacy domain found that adolescents who do not self-identify as having a body image problem (despite meeting DSM-5 criteria for an eating disorder) are less likely to seek help (Fatt et al., 2021). Raising awareness of MD and the available and accessible national and community support options should therefore be a key priority for practitioners, policy makers and researchers in an attempt to facilitate help-seeking for MD symptoms.

Furthermore, young adults invested in resistance training are at risk of developing MD symptoms, and gym environments are considered an exposed arena (Campagna & Bowsher, 2016). Exercise professionals, such as personal trainers, are therefore assumed to spend a significant amount of time with people at risk of developing MD symptoms. Health professionals could encounter individuals with MD symptoms as these individuals may experience issues such as depressive thoughts or muscle damage. Health and exercise professionals' ability to identify symptoms of MD is therefore important. Yet there is no empirical evidence related to health and exercise professionals' knowledge or competence about symptoms of MD. The aim of this study is therefore to explore health and exercise professionals' knowledge of, and experiences with, symptoms of MD in the Norwegian population. The study also aimed to address participants' experiences with identifying MD symptoms and perspectives related to prevention and intervention initiatives for MD symptoms.

2. Method

2.1. Research design and positionality statement

This study adopted a qualitative cross-sectional research design. The purpose of qualitative research is often to gain insight into experiences and details about a phenomenon, and to generate new ideas for further research (Silkose et al., 2021). The study has an exploratory approach, which is useful when little is known about the problem area (i.e., health and exercise professionals' knowledge of, and experiences with, MD symptoms). Individual semi-structured interviews were used to obtain rich data on the topic.

The positionality of the researchers of this study needs to be addressed. There are two authors of the current study, both white, Western born, highly educated and in the same age group as the participants in this study. The first author obtains a MSc degree and currently works as a Physical Education teacher, and the second author is a Doctor of Philosophy and currently works as an Associate Professor. It should be noted that the authors have experience researching and working with individuals associated with MD (e.g., gym members and exercise/health professionals). The first author conducted all the

interviews, and they were all completed in Norwegian, as this was the native language for both the interviewer and the participants. The first author conducted the analysis and the second author reviewed and helped finalize the analysis and results. The authors had some beliefs about MD prior to the study, which were a) exercising, physical activity and a healthy diet are important measures for physical and mental health, b) social media and gym environments can have a negative effect on people's body image, and c) health and exercise professionals have a unique opportunity to identify and potentially prevent MD symptoms due to their positionality.

2.2. Participants

To be included, participants had to be >18 years of age and have >1 year experience in a profession related to health and/or exercise. However, as this is the first study to investigate the current research question, the researchers aimed to interview people likely to have some professional experience related to MD. Seven health and exercise professionals (female: $n = 4$; male: $n = 3$) were recruited to take part in the current study (see Table 1). The participants represented a varied selection of health and exercise professionals: two personal trainers, one advisor in anti-doping work, one eating disorder advisor, one licensed psychologist, one physiotherapist with special expertise in cognitive therapy and one sports advisor. Table 1 summarize the participants, their occupation and experience with MD. The participants varied in age from 25 to 50 years ($M = 36.3$, $SD = 8.1$) and their work experience varied from 3 to 24 years ($M = 10.5$, $SD = 7.0$).

2.3. Procedure

Data was collected in Norway during autumn 2022 and the study was reviewed by the Norwegian Regional Committee for Medical and Healthcare Research and Ethics (ref. nr: 529,242; 22.09.2022) and the Norwegian Centre for Research Data prior to data collection. Data was collected using semi-structured interviews which gives the interview an open and flexible, yet systematic approach (Jacobsen, 2022). The interview guide was developed based on the literature and from discussions with experts in the field. The interview guide first consisted of some background questions (such as age, work history, experience, and their subjective perceived ability to identify symptoms of MD). Thereafter, the interview guide consisted of ten main questions with several follow-up questions. For example, "What experiences do you have with observing symptoms of muscle dysmorphia in patients/clients?", "What challenges are there around the identification of symptoms of muscle dysmorphia?" and "Which prevention measures and/or interventions do you believe can be effective for people with symptoms of muscle dysmorphia?". A copy of the interview guide can be obtained from the researchers upon request.

Prior to data collection, the interview guide was pilot tested with four health and exercise professionals to obtain their feedback on the questions. As a result, some structural and language changes were made and a few more follow-up questions were added. The interview guide was then finalized. Convenience sampling was used for recruiting participants and all seven participants were recruited through contacting several health and exercise organizations via email. All participants received a detailed study information sheet and gave their informed written consent prior to the interview. The interviews were conducted via video call ($n = 6$) or at the participants workplace ($n = 1$). All interviews were audio recorded, and then transcribed verbatim shortly after. The duration of the interviews ranged from 28 to 59 min.

2.4. Data analysis

To analyze the collected data, the six steps of thematic analysis was used (Braun & Clark, 2022): 1) familiarizing ourselves with the data by transcribing, reading and re-reading the data and noting down initial

Table 1
Summary of the participants, their occupation and experience with MD.

Participant	Occupation description	Experience with MD
Personal trainer, female	Help, guide and motivate individuals to set and reach goals in exercise. The client group mainly consist of adults (age 31–50) or elderly (age >50), both men and women, who wish for better health, weight loss or injury treatment.	No experience with MD in personal clients, but observations of, and conversations with gym-members. Emphasizes that she does not have experience with individuals with MD diagnosis, but symptoms of MD. Knowledge through self-interest and reading.
Personal trainer, male	Works as a personal trainer and with educating personal trainers. Clients are primarily men, but also women, at the age 45–60, who wants better health and better bodies.	Observations and conversations at the gym, both as an employee and as a member. Knowledge through courses and self-interest.
Advisor in anti-doping work, female	Works partially with doping prevention and research. Client group are primarily boys and men in the age 16–24.	Conversations with individuals, primarily through individuals who wants advice on doping, body image and muscle gain. Describes MD as difficult to observe and emphasize the importance of conversations. Knowledge through professional conversations at work and conversations with clients.
Advisor in eating disorders, female	Conversations with individuals who reach out due to symptoms of eating disorders, with the desire to get help. Clients of different ages and both sexes, from a young age. The majority of clients are women, but the participant points out that there is an increase in men who reach out.	Experience with clients who have symptoms of MD, mostly boys, from age 12. Due to confidentiality the participant does not describe her clients. In conversations with clients, she has gained insights in their thoughts, challenges and routines as a consequence of MD. Knowledge through courses and professional experiences.
Psychologist, male	Gives lectures and courses about mental health and has individual conversations with young adults as a low threshold offer for short term help with psychosocial problems. The majority of clients are women, and primarily between 19 and 25 years of age.	The participant states people with symptoms of MD are not his primary client group, but he has some experience with advising on MD. The participant refers to especially one individual with clear symptoms of MD. Knowledge mainly through lectures, courses and reading.
Physiotherapist with special expertise in cognitive therapy, female	Mainly short-term therapy to individuals with mild to moderate mental disorders/issues, in addition to working with exercise and physical activity as a psychosocial offer. Works primarily with girls, in the age 19–25.	Primarily theoretical competence.
Sports advisor, male	Works at a fitness center and describes himself as a “service-person”, in addition to personal training and dietary advisor. Clients and gym members differ in age, but the majority are in their 20 s.	Experience with MD from conversations and observations with clients and gym members. Knowledge through work experiences and conversations.

ideas, 2) generating initial codes and collecting data to the extracted codes, 3) assemble codes into themes and gathering all data relevant to each theme, 4) reviewing themes and checking if the themes work in relation to the data, 5) defining and naming themes, and 6) writing the analytic narrative. In the current study, codes and themes were extracted from the dataset when frequently occurring or when contributing to the research question as a salient concept. While thematic analysis is a flexible approach, a systematic and consistent procedure for analyzing the data is crucial, as the flexibility can lead to inconsistency and lack of coherence (Nowell et al., 2017). A transparent and detailed description of the process is therefore important. Each interview was coded separately, and then analyzed together with the codes from the other interviews to look for similarities and differences. Codes identified in the dataset were extracted and assembled into themes, subsequently each transcribed interview was then analyzed again, considering the codes and themes extracted from the first round. Themes and subthemes were defined and labeled, and further reviewed to avoid overlap and ensure connections. The analysis was then discussed among the researchers and alternative thematic structures were considered. To ensure authenticity of the data, the analysis had a participant-driven approach (i.e., all participant views and opinions were considered) and quotations from the interviews were used in the result to exemplify the participants experiences and perspectives.

3. Results

The purpose of the current study was to explore health and exercise professionals' knowledge of, and experiences with, symptoms of MD in the Norwegian population. From the thematic analysis, three overarching themes with relevant subthemes were developed (Table 2).

3.1. Theme 1: muscle dysmorphia symptomatology

The first theme is centered around MD symptomatology. Due to different professional backgrounds, some of the participants had more knowledge and experience with MD symptomatology than others. All seven participants were familiar with MD, however only five of them had experience with observing symptoms and consequences of MD.

3.1.1. Subtheme 1.1: experiences with symptoms of muscle dysmorphia

MD was described as a severe, complex, and all-consuming mental health disorder by five participants, all of which through their profession had encountered people displaying symptoms of MD. One of the participants stated:

“They [people with MD symptoms] are very tired, due to their strict regimen. There is no room for spontaneity. They work out before school, between classes, after school, and they are extremely rigid in their diet. Everything becomes very forced, and any deviation creates anxiety, which means they must compensate even more” (eating disorder advisor, female).

Table 2
Themes and subthemes developed from all interviews.

Theme	Subtheme
1. Muscle dysmorphia symptomatology	1.1 Experiences with symptoms of muscle dysmorphia 1.2 Experiences with consequences of muscle dysmorphia
2. Identifying muscle dysmorphia	2.1 Challenges with observing muscle dysmorphia symptoms 2.2 Challenges related to reluctance 2.3 Challenges related to lack of responsibility
3. Managing muscle dysmorphia	3.1 Preventing muscle dysmorphia symptom development 3.2 Future interventions and treatment for muscle dysmorphia symptoms

She continued: *“If you ask them how much time they spend on this, physically and mentally, the fact is every hour of every day. During school or work, with friends, family and even when they sleep”*. This participant had experience with approximately five patients showing symptoms of MD, and added that they defy everything to workout, even when their body is suffering from muscle damage and fatigue.

Several participants pointed out similarities between MD and eating disorders, particularly anorexia nervosa. Even though they were acquainted with the differences, they emphasized some similarities: *“Similar to an eating disorder, it’s a preoccupation with the body, and a distorted image of one’s body, which is time consuming and entails consequences”* (physiotherapist with specialization in cognitive therapy, female). The preoccupation with muscle gain within MD symptomatology was expressed through one of the participants comments:

“I had a long conversation with one of my patients about the side effects of AAS, and I mentioned stretch marks, you know, as a negative consequence... However, stretch marks on his biceps was his greatest wish as this indicated muscle gain” (adviser in anti-doping work, female).

Other similarities with anorexia nervosa mentioned by the participants were the need for control, and the emotions that emerge when control is not maintained. Even though the participants compared MD with anorexia nervosa, they emphasized that the symptomatology is different, and that defining MD as an eating disorder can be very misleading. One of the participants said:

“Eating disorders are often considered a feminine phenomenon. Anorexia nervosa and bulimia nervosa in young women have been getting a lot of attention. It is therefore important to keep the terms separated, because... in my experience, a lot of men do not pay attention when they hear the word eating disorder” (advisor in anti-doping work, female).

The participants with a professional background in exercise had less experience with observing symptoms of MD, compared to the four participants with a profession in health. The exercise professionals emphasized challenges related to identifying symptoms, however two of them clearly stated that symptoms must be seen in *“a bigger picture”*. Intense workouts over a long period, frequent mirror-checking and questions asked by gym-members related to muscle gain and diet were highlighted as observable symptoms. One of the participants said: *“Some questions asked by members at the gym can raise concern, for instance how to get bigger fast, and some questions about dietary supplements.”* (sports advisor, male).

3.1.2. Subtheme 1.2 experiences with consequences of muscle dysmorphia

Consequences of MD were discussed in only five of the interviews, due to two of the participants lacking experience in this area. Consequences mentioned in several interviews were injuries and overtraining, due to heavy workouts and minimal recovery between workouts. It was also mentioned that MD can lead to absence from school and work, and difficulties with maintaining relationships: *“They are unable to maintain and nurture relationships... Family, friends, school, work... it somehow doesn’t matter anymore”* (eating disorder advisor, female). Social isolation was also specified as a consequence of MD, which can be a worrying sign for parents and peers to look out for.

It was discussed in some of the interviews that symptoms of MD often coincide with symptoms of other mental disorders, such as anxiety and depression. Three participants said that they have met patients with mental challenges, such as depression, who also reported symptoms of MD. However, participants emphasized that they have encountered resistance when addressing these symptoms, such as denial or a poorer relationship with the patient. Whether anxiety and depression are a consequence of MD, or whether people with anxiety and depression are more at risk of developing MD, was unclear to participants.

3.2. Theme 2: identifying muscle dysmorphia

The second theme was developed due to the variety of challenges in relation to identifying MD symptoms and how to approach people with possible symptoms. The participants highlighted challenges related to observing symptoms, reluctance to receive help and lack of responsibility from professionals.

3.2.1. Subtheme 2.1: challenges with observing muscle dysmorphia symptoms

All participants mentioned that symptoms of MD can be difficult to identify as some of the most common symptoms may not be observable. Some of the participants stated that certain symptoms of MD can easily be misinterpreted. Without knowledge of a person’s routines and thoughts, MD symptoms can be overshadowed by what seems to be a healthy lifestyle. The participants therefore emphasized that a relationship based on trust is necessary for a person to come forward and to disclose their MD symptoms and concerns. One of the participants said:

“I’m not sure how I’m supposed to identify these symptoms, observable symptoms might be frequent training sessions, use of dietary supplements and preoccupation with one’s appearance, but these things are also common among all of our members, you know...” (personal trainer, male).

Another participant also stated:

“It is challenging to distinguish between passion for exercise, and what might be a mental disorder. MD can be very serious, but at the same time, we cannot assume that a person who strives for muscle gain is experiencing other symptoms of MD” (personal trainer, female).

In some of the interviews, it was emphasized that the difference between a person with MD and a person engaged in strength training, is their thoughts, body image and additional routines, such as a rigid schedule concerning workouts and protein intake at specific times during the day. However, these symptoms are not easily observed. Participants with a professional background in exercise said that they occasionally observe worrying behavior in gym members but decide not to approach them due to lack of knowledge and confidence. It was also mentioned that if approached, symptoms are denied by the gym member. The participants emphasized that observing MD symptoms requires sufficient knowledge about the signs and symptoms. In the interviews, participants were asked where they obtained their knowledge and competence of MD from. It was predominantly reported to be obtained through work experience, a personal interest or professional replenishment. Education did not come across as the main contributor, and one of the participants mentioned that: *“...there is hardly any focus on muscle dysmorphia during the education program, compared to eating disorders, which is a significantly huge part of both the education and later in the active work life”* (psychologist, male). However, it was mentioned by the health professional participants that keeping up with new research, such as MD research, is an important part of their professional responsibility and development. They said that MD is a phenomenon that has received more attention in recent years. One of the participants said:

“Physical therapists, and other health professionals, should have knowledge about muscle dysmorphia, to be able to identify symptoms. If patients seek help, whether it’s for muscle damage or symptoms of depression, we should be aware that this might actually be a consequence of muscle dysmorphia” (physiotherapist with specialization in cognitive behavioral therapy, female).

Several participants with a professional background in health said that MD can be comorbid with other disorders, such as depression or anxiety. They further emphasized that MD symptoms could go undetected, as symptoms of depression and anxiety are more familiar and obvious. The participants said that they would appreciate more information about MD both in their education, and in their training for specific jobs. A desire to have information available at the workplace

was also mentioned by the participants with a professional background in exercise.

3.2.2. Subtheme 2.2: challenges related to reluctance

A second challenge related to identifying symptoms of MD mentioned by the participants, was the reluctance to seek or receive help. Both the participants with a professional background in health and in exercise, mentioned that approaching people with symptoms of MD is not always successful: *“If we overwhelm them with questions about symptoms or whatever, it may lead to them changing gym... We can lose them as a member and will definitively not be able to help them”* (sports advisor, male). One participant with a professional background in health, explained that she had a patient who needed help with depressive thoughts, if the patient however was asked about MD symptoms, he responded with denial and distanced himself from further help.

Some of the participants also said that they believe individuals with MD symptoms might try to hide their symptoms due to taboo or shame. Masculine norms in the society are mentioned as one cause, and that receiving psychological help could be considered as a sign of weakness. Participants also stated that not being able to recognize their own symptoms, neither for themselves nor for others, due to ignorance or lack of knowledge, could be another reason for reluctance to seek and receive help. Both health and exercise professionals in this study therefore highlighted the importance of knowledge about MD in the society. If more people were familiar with MD, it could prevent taboo and shame. Simultaneously, more knowledge could increase parents, teachers, peers and health and exercise professionals' ability to identify symptoms, and to recognize own symptoms.

Two health professional participants mentioned that reluctance to receive help when showing symptoms of MD could be explained by an additional social factor. Some individuals may feel that their social life is centered within the fitness or gym environment, and taking steps to reduce MD symptoms could affect their sense of belonging, one of the participants explained:

“I believe that for a lot of those individuals with MD symptoms... the environment that triggers these symptoms... might also be an environment characterized by friendships, a sense of belonging and... seeking help could be perceived as taking distance from this environment” (physiotherapist with specialization in cognitive behavioral therapy, female).

3.2.3. Subtheme 2.3: challenges related to lack of responsibility

Both health and exercise professionals in this study discussed that lack of responsibility in their profession is a challenge when discussing challenges related to identifying symptoms. One of the participants said:

“I think it is very cowardly, that personal trainers observe worrying behavior in gym members, and choose to ignore... They don't know how to approach these situations. They need more knowledge, but so do we. We should cooperate and lean on each other” (counselor for eating disorders, female).

During the interviews, several exercise professional participants expressed a clear desire for better routines on how to approach members when they show worrying behavior related to MD or eating disorders. They are aware of their responsibilities, but need more information, guidelines, and knowledge to follow through. One of the participants who works at a gym, mentioned that they have one employee who is responsible for approaching and talking with members when concerns are voiced. He also emphasized that all the employees have a responsibility to care, and to establish some kind of relationship with members, so that if they have to express concerns, this conversation will occur more naturally. The participant said:

“We first contact them without mentioning these concerns. We just talk to them about how things are going, how the workout or progression is going,

then we leave it for a bit. If you just go straight to that topic and ... well, then they can go on the defensive or may not return to the gym” (sports adviser, male).

It is clear in the interviews that routines vary from different fitness centers, as one of the other participants said:

“I have told the gym owners several times about different observations and concerns (...) but when they don't take action I do not know what to do... Maybe I have a responsibility, but it's not my decision, I feel like my leader should take action here” (personal trainer, female).

However, the same participant said that personal trainers should receive more education and increase their knowledge, as they have an important responsibility:

“I am present at the gym several hours of the day. I observe the same people every day. It is easier for me to recognize some sort of worrying behavior or pattern (...). I should pay attention to what happens at the gym, as opposed to members who should focus on their own workout” (personal trainer, woman).

3.3. Theme 3: managing muscle dysmorphia

During the interviews the participants were asked about experiences and thoughts about prevention measures, interventions, and potential treatment options for MD symptoms. This led to the development of a third theme. All participants emphasized prevention measures, and four of the participants with a professional background in health, shared their experiences and thoughts considering treatment options.

3.3.1. Subtheme 3.1: preventing muscle dysmorphia symptom development

All the participants highlighted informational work and raising awareness as important prevention measures. This included increased knowledge among parents, teachers, peers and health and exercise professionals. One participant said:

“It is very important that parents increase their knowledge... It is incredibly hard as a mother or father... They need to know what to look for, and what they can do as a parent. They need to be aware if they see a change in behavior, isolation, and other symptoms. However, it can be very difficult to recognize before it has gone too far” (counselor for eating disorders, female).

Teachers were also given an important role in identifying symptoms and preventing them from evolving, as they spend a lot of time together with students at a vulnerable age. They need more knowledge on what to look for and who to contact for support if necessary. Some participants also emphasized that more information at the gym, among employees and among members is important.

MD was further associated with performance enhancing drugs in some of the interviews. Youth and young adults should be aware of MD symptomatology, as well as consequences of performance enhancing drugs, such as AAS. One of the participants who works with preventing performance enhancing drug use, said:

“To prevent use of performance enhancing drugs it is important to be on the forefront. That moment when a young boy or girl is offered something illegal, they should be familiar with the consequences. It is important that we build good preventers. When I lecture a class of thirty students, I may reach out to twenty-nine of them, but these twenty-nine students, can contribute to good attitudes and prevent drug use among their peers and that one student who didn't agree with me” (adviser in anti-doping work, female).

Social environments, among teens, at the gym, and during childhood, are considered important when addressing prevention factors for MD among the participants. They are particularly concerned about values and attitudes that are promoted in the society and on social

media, and how awareness can act as an important prevention measure. One of the participants said:

“As personal trainers, we need to address how we can communicate healthy attitudes, and assist clients in reaching healthy goals, how they look at their own body, and how they measure their *own success*. We should be role models, and communicate good values, instead of becoming experts on muscle dysmorphia or eating disorders” (personal trainer, male).

Another participant was more concerned with factors in the socialization process:

“If kids have fun when being active, I hope they can avoid body pressure in the future. If you at the age of seventeen start working out, with a goal of changing your body, you will be more focused on appearance and comparing yourself with others. However, if a seventeen-year-old, previously engaged in soccer, volleyball or swimming start working out at a gym, his or hers intentions may be different, and more occupied with performance. I think positive experiences with physical activity in early childhood and youth, can prevent body image issues and for instance MD in the future” (sports adviser, male).

More specific prevention measures were also discussed in the interviews, such as limiting the use of mirrors in the gym, dress codes and how social media influence: “The biggest issue is social media, which contributes to a great deal of body pressure... That algorithm can be damaging” (sports adviser, male). Some of the participants, however, also stated that how this issue is promoted need to be considered, to avoid “exaggeration and hysteria” (personal trainer, male). One of the participants said:

“Resistance training is not the issue, neither is pursuing bigger muscles. Joining a gym can be a good thing for both the physical and mental health. Some people may think protein powder is the beginning, and AAS is the end” (personal trainer, male).

When prevention measures were discussed during the interviews, there seemed to be a consistent opinion among the participants. To prevent MD symptoms, body image disturbance and challenges, such as MD, should be recognized in the society. Increased knowledge in the society is therefore a key priority. Increased recognition can contribute to less taboo and more knowledge, which might help people in identifying symptoms both in themselves and in others at an early stage.

3.3.2. Subtheme 3.2: future interventions and treatment for muscle dysmorphia symptoms

The purpose of this study was to gain insight in health and exercise professionals experiences and thoughts related to identifying and approaching MD. Such knowledge can further contribute to develop interventions for people with MD symptoms. During the interviews, the participants were therefore asked if they had experience with treatment of MD symptoms. Four of the participants, a psychologist, a counselor in eating disorders, a counselor in anti-doping work and a physiotherapist with specialization in cognitive behavioral therapy, had knowledge and experience related to this topic. All four emphasized that the biggest challenge is the lack of motivation to receive help in people with MD symptoms. Their reluctance to acknowledge the problem, seek professional help, change their routines, and give up control was highlighted. The participants further emphasized the importance of exercise and health professionals, teachers, parents and peers awareness of symptoms and knowledge on how to approach these situations.

Several participants addressed the gym environment as a challenge, when discussing interventions and treatment options. One participant described this environment as “destructive”, but that the sense of affiliation can have a positive impact on an individual’s wellbeing. Another participant said:

“The social environment at the gym is often a huge part of a person’s social life. You might compare it to drug addiction. The environment can be triggering. During treatment you should minimize spending time in this environment, however, this can be very difficult” (counselor on eating disorder, female).

One of the participants, a psychologist, further emphasized a two-fold approach, consisting of one cognitive and emotional component, and one behavioral component. Considering the cognitive and emotional component, motivational interviews were mentioned, particularly when AAS are involved. Cognitive behavioral therapy and dialogue centered around the patient’s thoughts and emotions related to body image and body pressure was also mentioned. One of the participants with treatment-related experience said:

“We [the participant and her patient] might work on strengthening the patient’s self-esteem. Finding out why a muscular body is the most important thing in the patient’s life, and where the desire for a muscular body derives from. We work on finding an inner peace, and self-esteem that does not require external recognition” (eating disorder advisor, female).

Another participant mentioned the importance of addressing negative thoughts and its triggers, and described:

“We [the participant and her patient] are searching for triggers, or factors, that maintain these thoughts, the anxiety... It is also important to be aware of social media use, and actions like comparison, weighing or frequently looking in the mirror. We focus on addressing thoughts that should replace negative and self-destructive thoughts” (physiotherapist with specialization in cognitive behavioral therapy, female).

Related to a behavioral component, several participants emphasized different methods for reducing behavior and actions controlled by anxiety and obsessions. One of the participants said:

“We [the participant and her patient] might create a daily or weekly schedule and add some sort of spontaneity or opportunity for socialization during the day. It’s all about the control, and to dare to give up some of that control. Of course, this will be uncomfortable at first, but only to such a small degree that it does not become anxiety-inducing. It is however going to create a disturbance that the patient will have to deal with” (advisor in eating disorders, female).

One participant stated that both components are of importance. However, he pointed out that the feelings and thoughts are often the underlying problem, and that working with thoughts, emotions, values, and attitudes is fundamental.

The effect of treatment measures was not mentioned in any of the interviews. However, the participants pointed out that interventions and treatments are time consuming and long lasting. They described it as a complex process, where they as a professional never get to experience the effect, because patients are often being referred to other health services or institutions during the treatment process. As there are no specific treatment option, the result is an approach of trial and error, where several resources might get involved. The participants in this study emphasized treatment of MD in individuals where MD symptoms have developed to a severe extent. However, interventions or resources to prevent symptoms from developing at an early stage are not discussed in the interviews.

4. Discussion

This study aimed to explore health and exercise professionals’ knowledge of, and experience with symptoms of MD in the Norwegian population, as well as their perspectives around MD prevention and interventions. To our knowledge, this is the first study to interview health and exercise professionals on this subject. Three overarching themes were generated from the data, highlighting the participants

experience with MD symptoms and consequences, challenges related to identifying MD symptoms and perspectives on how to manage MD. Observable symptoms of MD reported by the participants in this study were related to body image disturbance, a preoccupation with muscle gain and excessive exercise behaviors. These symptoms align with the findings of previous research (e.g., Martenstyn et al., 2022; Sandgren & Lavalée, 2018) where a desire for muscularity, rigorous diets and frequent workouts at the expense of social life is reported. Observations made by the participants align with findings from previous qualitative research on how people with MD experience symptoms, such as the willingness to sacrifice health, social impairment and compulsive mirror checking (Martenstyn et al., 2022). Symptoms emphasized by the participants in the current study are also consistent with the symptoms highlighted in the DSM-5 criteria (APA, 2013) and questionnaires such as the Muscle Dysmorphic Disorder Inventory (MDDI; Hildebrandt et al., 2004) and the muscle dysmorphia inventory (MDI; Rhea et al., 2004). Previous research, such as Cafri et al. (2008) described MD as a complex disorder, where symptoms must be seen in context. Leone et al. (2005) also highlighted that observable symptoms of MD can be camouflaged by the demands of the sport, in for example powerlifters or bodybuilders.

The participants in the current study discussed some consequences of MD symptoms which they had observed among their clients/patients, such as muscle damage, fatigue, isolation and the use of performance enhancing drugs. Mental issues such as anxiety and depression were also mentioned, however, it is unclear whether this is a consequence of MD, or if individuals with anxiety or depression are at higher risk of developing MD. Previous research has found an association with MD and symptoms of anxiety and depression (Chandler et al., 2009; Grieve & Shacklette, 2012; Longobardi et al., 2017). The use of performance enhancing drugs as a consequence of MD is also highlighted in several previous studies (e.g., Greenway & Price, 2018; Harris et al., 2019). As the use of AAS can be a consequence of MD (Rohman, 2009), it can be considered an important observable symptom. It should however be highlighted that people can have symptoms of MD without using performance enhancing drugs, and vice versa (Rohman, 2009).

Many individuals with MD symptoms are reluctant to receive help and support (e.g., Grieve et al., 2009; Leone et al., 2005). A study by Fatt et al. (2021) suggests that help-seeking in adolescents with a body image problem is related to their level of self-identification. Participants in the current study therefore highlighted the importance of increasing the knowledge both among health and exercise professionals and in the society in general. However, lack of responsibility from health and exercise professionals was mentioned as a challenge in the current study. Participants mentioned lack of knowledge and routines as a cause. A study by Vandereycken (2011) examined researchers and professionals in the field of eating disorder and their perception on several “new” disorders in DSM-5. Results revealed that despite knowledge of MD, symptoms were rarely observed, and participants described MD as a “trend”, created by the Western culture, and something that should not receive further attention. These findings could explain the lack of responsibility described by participants in the current study. However, the participants in this study emphasized that MD should be taken seriously and described MD as a severe and complex issue affecting many individuals they work with. The twelve-year gap between Vandereycken (2011) and the current study is important, as MD has received significantly more research and attention in the last decade, so it is reasonable to assume that people’s views have changed.

The last theme identified was related to managing MD, where prevention measures for MD is highlighted. Increased knowledge and information in society in general, and among health and exercise professionals was frequently mentioned by the participants. Several studies indicate that young adults, involved in resistance training or strength sports, are at higher risk of developing MD symptoms (e.g., Skemp et al., 2019; Thomas et al., 2011). Skemp et al. (2019) was therefore concerned with the importance of awareness among

professionals working close to this group. Increased knowledge can contribute to people being able to identify MD symptoms at an earlier stage. It is also important to recognize the impact that more knowledge can have on removing taboo and shame related to mental issues and psychological help among men (Pope et al., 2000; Whitley, 2021).

Body image concerns are strongly linked to the development of MD symptoms (Almeida et al., 2019; Leone et al., 2005; Thomas et al., 2011), and participants in the current study highlighted the importance of how we, as a society, talk about physical appearance, body ideals and social media to prevent MD. A study by Imperatori et al. (2022) suggested that social media addiction can influence the development of MD. Social media, such as Instagram, often expose adolescents to body image pressure through idealizing an unrealistic body. It is therefore important that adolescents learn to be critical to social media.

The socialization process and positive experiences with physical activity is further mentioned by the interview participants as important prevention measures. Research indicates that physical activity can have great effects on mental health, for example increased self- and body image, and prevention of depression and anxiety (Vella et al., 2021). The participants in this current study suggested that teachers, coaches and parents should focus on creating good experiences with physical activity, causing intrinsic motivation to engage in physical activity, rather than extrinsic motivation and the pursuit of an ideal body. This is supported by previous research, which indicates that intrinsic motivation and good experiences with physical activity in childhood and adolescence will more likely cause lifelong enjoyment of movement (e.g. Ryan et al., 2009). Previous research also suggests that intrinsic motivation to exercise is associated with enhanced self-image and self-efficacy. On the other hand, extrinsic motivation to exercise, such as the desire to change appearance, is associated with increased body disturbance, pressure to look a certain way and MD symptoms (e.g. Almeida et al., 2019; Murray et al., 2016; Skemp et al., 2013).

Interventions and treatments for MD were discussed in four of the interviews. The counselor in eating disorders, the physiotherapist with specialization in cognitive behavioral therapy, the psychologist and the counselor in anti-doping work, contributed with their own experiences and perspectives. During the interviews, and in the literature, it is consistent that a barrier to seek and receive help, and lack of motivation for treatment is a challenge for people with MD (Leone et al., 2005). Two of the participants, a psychologist and an advisor in anti-doping work, therefore suggested motivational interview as an effective treatment tool for people with MD. Motivational interviewing is also suggested in existing literature as an effective method to motivate people with MD symptoms for change (Grieve et al., 2009). Motivational interviewing is a particularly useful approach when people are reluctant to change, and studies indicate positive effects of motivational interviewing for a number of different health and behavior-related problems (e.g., doping problems; Killeen et al., 2014). A study by Phillips et al. (2008) also indicated that motivational interviewing can be effective for people with body dysmorphic disorder. On the other hand, there are currently no studies that examine the effect of motivational interviewing for people with MD.

During the interviews, techniques such as reflecting over inner destructive thoughts, and exposure and response prevention were mentioned as treatments for MD. The participants had experience with patients with MD symptoms trying to identify triggers, changing thought patterns, and working towards minimizing the need for control related to diet and workouts. Cognitive behavioral therapy, including measures similar to those mentioned by the participants, has previously been proposed as an effective treatment for MD, based on the effect this type of treatment has on, for example, eating disorders (Leone et al., 2005). In recent years, a number of studies have been published that investigate the effect of various interventions or treatment options for exercise addiction, eating disorders and body dissatisfaction (e.g., Brown et al., 2017; Murray & Griffith, 2015; Outar et al., 2021). However, there are very few studies that examine the effect of interventions and treatment

to reduce symptoms of MD. Some studies have investigated the effect of specific treatment options (e.g., Brown et al., 2017; Murray & Griffith, 2015; Outar et al., 2021). In both Murray and Griffith (2015), Outar et al. (2021) and Brown et al. (2017), treatments and interventions to reduce MD symptoms have had a significant effect. However, in a recently published article by Sandgren and Lavallee (2023), more research that can help develop early interventions specifically for addressing MD is encouraged (e.g., where the views and preferences of people with MD are incorporated into the design and delivery of the intervention to make it more acceptable and suitable for the target group). This future endeavor may help with recruiting more individuals with MD symptoms to take part in, and engage with, interventions and support resources. Future intervention developers should also consider any gender differences in relation to MD when developing their programs, and recruiting females with MD symptoms will be important to obtain their views and preferences in the stages of development.

This study explored both health and exercise professionals' views on MD. Although MD was described as a severe and complex mental issue, and the desire for more knowledge was highlighted in all of the interviews, there were some differences between the two groups. For example, exercise professionals were concerned about challenges in distinguishing between MD symptoms and a passion for exercise and a healthy lifestyle. The three exercise professionals interviewed in this study expressed frustration related to lack of knowledge, lack of responsibility and the need for future resources available at the gym to reach and support people with possible MD symptoms. In contrast, the health professionals discussed specific symptoms of MD, prevention measures and experiences with treatments for MD. Health professionals also emphasized the responsibility exercise professionals have related to identifying symptoms and supporting individuals with MD symptoms. Exercise professionals did however point out possible pitfalls in approaching gym members and the importance of a nuanced dissemination.

A significant strength of this study is that it is the first to explore health and exercise professionals' views on and experiences with MD. This offers an objective perspective on the symptomatology of MD, as the majority of research to this date is based on subjective self-reported symptoms. The study also includes perspectives from different occupations within health and exercise, allowing us to explore various aspects in the health and exercise domains. However, the results only reflect the views of seven health and exercise professionals based in Norway, which constitutes an important limitation. The participants also represent very different professional backgrounds. It is therefore unclear whether the participants views and perspectives are common for their profession or if their perspectives are a result of something else. The selection of participants is also based on a convenience sample, which is a limitation and potential selection or information bias. It is likely that a different selection of participants could provide different perspectives and observations on the topic. Furthermore, the basis of comparison is minimal as there is limited research in this area. In future research, focus group interviews should be considered, as this could provide useful discussions between professionals with the same and/or different occupations and experiences. Future research should also focus on developing and investigating effective resources and interventions, aimed to assist health and exercise professionals in approaching individuals, both men and women, with MD symptoms, and to prevent the development of MD symptoms in individuals at risk.

5. Conclusion

This study aimed to explore health and exercise professionals' views on MD in the Norwegian population. This study adds to the current understanding of MD, as the complexity and severity described by the participants supports what has been previously suggested in qualitative research addressing the experience of individuals with symptoms of MD. These findings substantiate that health and exercise professionals should

be aware of MD symptoms. However, insecurities and lack of knowledge were mentioned as barriers in approaching individuals with MD symptoms. Increased knowledge among health and exercise professionals, parents, teachers and in society in general were therefore highlighted as important prevention measures. Health and exercise professionals can have an important role in identifying MD symptoms, support individuals with MD symptoms and introduce intervention and treatment options. Developing support resources for health and exercise professionals to help them identify symptoms and support individuals with MD should be a priority. This will be particularly important considering that there are challenges with getting individuals with MD symptoms to disclose their symptoms and to seek support.

Glossary

Anxiety: excessive worry and apprehensive expectations (APA, 2013).

Body dysmorphic disorder: a mental illness characterized by the preoccupation and constant worrying over a perceived or slight defect in appearance (APA, 2013).

Body image: a person's subjective picture or mental image of their own body.

Body image disturbance: a distorted perception of how someone sees their own body.

Depression: a mood disorder that causes a persistent feeling of sadness and loss of interest (APA, 2013)

Health professionals: authorized or unauthorized health professionals, working with health promotion/preventive work in the health and care sector or in another private/public sector.

Muscle dysmorphia: a mental health disorder characterized by a significant concern about one's muscularity and the belief that one is insufficiently muscular (APA, 2013).

Data availability

Due to the nature of this research, participants did not agree for their data to be shared publicly, so supporting data are not available.

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CRediT authorship contribution statement

Lena Langeland: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Sebastian S. Sandgren: Conceptualization, Methodology, Writing – review & editing, Project administration, Supervision.

Declaration of competing interest

The authors have no financial or non-financial competing interests to declare.

References

- Almeida, M., Campos, P. F., Gomes, V. M. G. M., Neves, C. M., Queiroz, A. C. C., Brito, C. J., Miarka, B., Ferreira, M. E. C., & De Carvalho, P. H. B. (2019). Muscle dysmorphia, body image disturbances and commitment to exercise: A comparison between sedentary and physical active undergraduate men. *Journal of Physical Education and Sport*, 19(1), 507–513. <https://doi.org/10.7752/jpes.2019.01074>

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*. (5. utg). American Psychiatric Publishing.
- Bozsik, F., Whisenhunt, B. L., Hudson, D. L., Bennett, B., & Lundgren, J. D. (2018). Thin is in? Think again: The rising importance of muscularity in the thin ideal female body. *Sex Roles*, 79(9–10), 609–615. <https://doi.org/10.1007/s11199-017-0886-0>
- Braun, V., & Clark, V. (2022). *Thematic analysis. a practical guide*. Sage Publications Ltd.
- Brown, T. A., Forney, K. J., Pinner, D., & Keel, P. K. (2017). A randomized controlled trial of The Body Project: More than muscles for men with body dissatisfaction. *The International Journal of Eating Disorders*, 50(8), 873–883. <https://doi.org/10.1002/eat.22724>
- Campagna, J. D. A., & Bowsher, B. (2016). Prevalence of body dysmorphic disorder and muscle dysmorphia among entry-level military personnel. *Military Medicine*, 181(5), 494–501. <https://doi.org/10.7205/MILMED-D-15-00118>
- Cafri, G., Olivardia, R., & Thompson, J. K. (2008). Symptom characteristics and psychiatric comorbidity among males with muscle dysmorphia. *Comprehensive Psychiatry*, 49(4), 374–379. <https://doi.org/10.1016/j.comppsych.2008.01.003>
- Chandler, C. G., Grieve, F. G., Derryberry, W. P., & Pegg, P. O. (2009). Are anxiety and obsessive-compulsive symptoms related to muscle dysmorphia? *International Journal of Men's Health*, 8(2), 143–154. <https://doi.org/10.3149/jmh.0802.143>
- Cunningham, M. L., Griffiths, S., Mitchison, D., Mond, J. M., Castle, D., & Murray, S. B. (2017). Muscle dysmorphia: An overview of clinical features and treatment options. *Journal of Cognitive Psychotherapy*, 31(4), 255–271. <https://doi.org/10.1891/0889-8391.31.4.255>
- Davey, C. M., & Bishop, J. B. (2006). Muscle dysmorphia among college men: An emerging gender-related counseling concern. *Journal of College Counseling*, 9(2), 171–180. <https://doi.org/10.1002/j.2161-1882.2006.tb00104.x>
- Dryer, R., Farr, M., Hiramatsu, I., & Quinton, S. (2016). The role of sociocultural influences on symptoms of muscle dysmorphia and eating disorders in men, and the mediating effects of perfectionism. *Behavioral Medicine (Washington, D.C.)*, 42(3), 174–182. <https://doi.org/10.1080/08964289.2015.1122570>
- Fatt, S. J., Mond, J., Bussey, K., Griffiths, S., Murray, S. B., Loneragan, A., Hay, P., Pike, K., Trompeter, N., & Mitchison, D. (2021). Seeing yourself clearly: Self-identification of a body image problem in adolescents with an eating disorder. *Early Intervention in Psychiatry*, 15(3), 577–584. <https://doi.org/10.1111/eip.12987>
- Greenway, C. W., & Price, C. (2018). A qualitative study of the motivations for anabolic-androgenic steroid use: The role of muscle dysmorphia and self-esteem in long-term users. *Performance enhancement & health*, 6(1), 12–20. <https://doi.org/10.1016/j.peh.2018.02.002>
- Grieve, F. G., & Shacklette, M. D. (2012). Brief report on men's bodies and mood: Correlates between depressive symptoms and muscle dysmorphia symptoms. *North American Journal of Psychology*, 14(3), 563.
- Grieve, F. G., Truba, N., & Bowersox, S. (2009). Etiology, assessment, and treatment of muscle dysmorphia. *Journal of Cognitive Psychotherapy*, 23(4), 306–314. <https://doi.org/10.1891/0889-8391.23.4.306>
- Harris, M. A., Alwyn, T., & Dunn, M. (2019). Symptoms of muscle dysmorphia between users of anabolic androgenic steroids with varying usage and bodybuilding experience. *European Journal of Health Psychology*, 26(1), 21–24. <https://doi.org/10.1027/2512-8442/a000023>
- Hildebrandt, T., Langenbacher, J., & Schlundt, D. G. (2004). Muscularity concerns among men: Development of attitudinal and perceptual measures. *Body Image*, 1(2), 169–181. <https://doi.org/10.1016/j.bodyim.2004.01.001>
- Imperatori, C., Panno, A., Carbone, G. A., Corazza, O., Taddei, I., Bernabei, L., Massullo, C., Prevete, E., Tarsitani, L., Pasquini, M., Farina, B., Biondi, M., & Bersani, F. S. (2022). The association between social media addiction and eating disturbances is mediated by muscle dysmorphia-related symptoms: A cross-sectional study in a sample of young adults. *Eating and Weight Disorders*, 27(3), 1131–1140. <https://doi.org/10.1007/s40519-021-01232-2>
- Jacobsen, D. I. (2022). *Hvordan gjennomføre undersøkelser? innføring i samfunnsvitenskapelig metode*. Cappelen Damm Akademisk (4. utg.).
- Killeen, T. K., Cassin, S. E., & Geller, J. (2014). Motivational Interviewing in the Treatment of Substance Use Disorders, Addictions, and Eating Disorders (Red.). In T. D. I. Brewerton, & A. Baker Dennis (Eds.), *Eating disorders, addictions and substance use disorders: research, clinical and treatment perspectives* (pp. 491–507). Springer. s.
- Leone, J. E., Sedory, E. J., & Gray, K. A. (2005). Recognition and treatment of muscle dysmorphia and related body image disorders. *Journal of Athletic Training*, 40(4), 352–359.
- Longobardi, C., Prino, L. E., Fabris, M. A., & Settanni, M. (2017). Muscle Dysmorphia and Psychopathology: Findings from an Italian sample of male bodybuilders. *Psychiatry Research*, 256, 231–236. <https://doi.org/10.1016/j.psychres.2017.06.065>
- Martenstyn, J. A., Aouad, P., Touyz, S., & Maguire, S. (2022a). Treatment of compulsive exercise in eating disorders and muscle dysmorphia: A systematic review and meta-analysis. *Clinical Psychology*, 29(2), 143–161. <https://doi.org/10.1037/cps0000664>
- Martenstyn, J. A., Maguire, S., & Griffiths, S. (2022b). A qualitative investigation of the phenomenology of muscle dysmorphia: Part 1. *Body Image*, 43, 486–503. <https://doi.org/10.1016/j.bodyim.2022.10.009>
- Meinich-Bache, K. (2019). Muskeldysmorfi hos menn med medlemskap på treningscenter: En undersøkelse av utbredelse og potensielle korrelater. [Masters thesis]. University of Agder. <https://uia.brage.unit.no/uia-xmlui/bitstream/handle/11250/2620247/Meinich-Bache%2C%20Kristian.pdf?sequence=1>
- Mitchison, D., Mond, J., Griffiths, S., Hay, P., Nagata, J. M., Bussey, K., Trompeter, N., Loneragan, A., & Murray, S. B. (2022). Prevalence of muscle dysmorphia in adolescents: Findings from the EveryBODY study. *Psychological Medicine*, 52(14), 3142–3149. <https://doi.org/10.1017/S0033291720005206>
- Murray, S. B., & Griffiths, S. (2015). Adolescent muscle dysmorphia and family-based treatment: A case report. *Clinical Child Psychology and Psychiatry*, 20(2), 324–330. <https://doi.org/10.1177/1359104514521639>
- Murray, S. B., Griffiths, S., Mond, J. M., Kean, J., & Blashill, A. J. (2016). Anabolic steroid use and body image psychopathology in men: Delineating between appearance-versus performance-driven motivations. *Drug and Alcohol Dependence*, 165, 198–202. <https://doi.org/10.1016/j.drugalcdep.2016.06.008>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis. *International Journal of Qualitative Methods*, 16(1), 1–13. <https://doi.org/10.1177/1609406917733847>
- Ortiz, S. N., Forrest, L. N., & Smith, A. R. (2021). Correlates of suicidal thoughts and attempts in males engaging in muscle dysmorphia or eating disorder symptoms. *Journal of Clinical Psychology*, 77(4), 1106–1115. <https://doi.org/10.1002/jclp.23102>
- Outar, L., Turner, M. J., Wood, A. G., & O'Connor, H. (2021). Muscularity rationality: An examination of the use of rational emotive behaviour therapy (REBT) upon exercisers at risk of muscle dysmorphia. *Psychology of Sport and Exercise*, 52, Article 101813. <https://doi.org/10.1016/j.psychsport.2020.101813>
- Phillips, K. A., Didie, E. R., Feusner, J. M. D., & Wilhelm, S. (2008). Body dysmorphic disorder: Treating an underrecognized disorder. *American Journal of Psychiatry*, 165(9), 1111–1118. <https://doi.org/10.1176/appi.ajp.2008.08040500>
- Pope, H. G., Gruber, A. J., Choi, P., Olivardia, R., & Phillips, K. A. (1997). Muscle dysmorphia: An underrecognized form of body dysmorphic disorder. *Psychosomatics*, 38(6), 548–557. [https://doi.org/10.1016/S0033-3182\(97\)1400-2](https://doi.org/10.1016/S0033-3182(97)1400-2)
- Pope, H. G., Phillips, K. A., & Olivardia, R. (2000). *The adonis complex - The secret crisis of male body obsession*. The Free Press.
- Rhea, D. J., Lantz, C. D., & Cornelius, A. E. (2004). Development of the muscle dysmorphia inventory (MDI). *Journal of Sports Medicine and Physical Fitness*, 44(4), 428–435.
- Rohman. (2009). The relationship between anabolic androgenic steroids and muscle dysmorphia: A review. *Eating Disorders*, 17(3), 187–199. <https://doi.org/10.1080/10640260902848477>
- Ryan, R. M., Williams, G. C., Patrick, H., & Deci, E. L. (2009). Self-determination theory and physical activity: The dynamics of motivation in development and wellness. *Hellenic Journal of Psychology*, 6(2), 107–124.
- Sandgren, S. S., & Lavalée, D. (2018). Muscle dysmorphia research neglects DSM-5 diagnostic criteria. *Journal of loss & trauma*, 23(3), 211–243. <https://doi.org/10.1080/15325024.2018.1428484>
- Sandgren, S. S., & Lavalée, D. (2023). Intervention development for people with muscle dysmorphia symptoms: Best practice and future recommendations. *Journal of loss & trauma*, 28(4), 315–326. <https://doi.org/10.1080/15325024.2022.2119718>
- Silkoset, R., Gripsrud, G., & Olsson, U. H. (2021). *Metode, dataanalyse og innsikt*. Cappelen Damm Akademisk (4. utg.).
- Skemp, K. M., Mikat, R. P., Schenck, K. P., & Kramer, N. A. (2013). Muscle dysmorphia: Risk may be influenced by goals of the weightlifter. *The Journal of Strength & Conditioning Research*, 27(9), 2427–2432. <https://doi.org/10.1519/JSC.0b013e3182825474>
- Skemp, K. M., Elwood, R. L., & Reineke, D. M. (2019). Adolescent boys are at risk for body image dissatisfaction and muscle dysmorphia. *Californian Journal of Health Promotion*, 17(1), 61–70. <https://doi.org/10.32398/cjhp.v17i1.2224>
- Thomas, L. S., Tod, D. A., & Lavalée, D. E. (2011). Variability in muscle dysmorphia symptoms: The influence of weight training. *Journal of Strength and Conditioning Research*, 25(3), 846–851. <https://doi.org/10.1519/JSC.0b013e3181c70c17>
- Tod, D., Edwards, C., & Cranswick, I. (2016). Muscle dysmorphia: Current insights. *Psychology Research and Behavior Management*, 9, 179–188. <https://doi.org/10.2147/PRBM.S97404>
- Vandereycken, W. (2011). Media hype, diagnostic fad or genuine disorder? Professionals' opinions about night eating syndrome, orthorexia, muscle dysmorphia, and emetophobia. *The Journal of Treatment & Prevention*, 19(2), 145–155. <https://doi.org/10.1080/10640266.2011.551634>
- Vella, S. A., Sutcliffe, J., Schweickle, M. J., Liddle, S. K., & Swann, C. (2021). Mental health and childhood participation in organised sport (Red.). In R. I. Bailey, J. P. Agans, J. Coté, A. Daly-Smith, & P. D. Tomporowski (Eds.), *Physical activity and sport during the first ten years of life: multidisciplinary perspectives* (pp. 100–110). Routledge. s.
- Whitley, R. (2021). *Men's issues and men's mental health: an introductory primer*. Springer.
- White, E. K., Mooney, J., & Warren, C. S. (2019). Ethnicity, eating pathology, drive for muscularity, and muscle dysmorphia in college men: A descriptive study. *Eating Disorders*, 27(2), 137–151.