Spring 2022

# Influence of Social Expectations on Muscle Dysmorphia in College-Age Males Studying Exercise Science

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**Abstract**

Muscle dysmorphia (MD) is a subtype of body dysmorphic disorder. MD causes the individual to experience significant clinical impairment and distress, specifically regarding their size and muscularity. Individuals suffering from MD are preoccupied with their physical appearance. The prevalence of MD has been shown to be higher in males studying health care professions compared to the general population (Bo et al., 2014). PURPOSE: To investigate the correlation between the risk of an individual developing MD and the presence of unrealistic social expectations. The research question is "How do unrealistic social expectations influence the development of muscle dysmorphia in college-age males studying exercise science?". METHODS: An electronic survey was distributed to all exercise science students at The University of Akron. This survey was targeted exclusively at male students; any responses received by females were not analyzed. The survey consisted of 20 questions that were aimed at determining the individual's risk of developing muscle dysmorphia and determining how likely the individual is to have been influenced by social expectations. The responses were recorded and evaluated using a line of best fits. The correlation coefficient was calculated and evaluated to identify any correlation. RESULTS: Twenty responses were analyzed in the line of best fit. The correlation coefficient was calculated as 0.3583. DISCUSSION: The sample size was too small to make any declarations of correlation. A correlation coefficient of 0.3583 is indicative of a small positive correlation between the risk of an individual developing MD and the presence of unrealistic social expectations.

*Keywords:* muscle dysmorphia, social expectations, body dysmorphia, exercise addiction.

## Introduction

Muscle dysmorphia (MD) is a disorder in which an individual has a preoccupation with a perceived defect in their physical appearance regarding their muscularity (APA, 2013). Individuals with this disorder can be addicted to the process of maintaining a certain body image. This addiction can lead to them performing many repetitive harmful behaviors such as excessive exercise and drug abuse (Foster et al., 2015). The presence of MD is greatly associated with clinical depression with 75% of those diagnosed with MD also experiencing clinical depression. Individuals with MD also possess higher suicide rates than the general population (Phillips & Hollander, 2008).

This study focused on the relationship between the risk of muscle dysmorphia and unrealistic social expectations. Muscularity is emphasized in men in the media which can lead to young men being placed under unrealistic pressure to possess a certain amount of muscularity. These expectations are exclusive to men, which is the reason behind the decision to only focus on men in this study. It has been shown that college-age students studying health care professions are at an increased risk of developing MD (Bo et al., 2014). This study gives insight into the relationship between the risk of MD and unrealistic social expectations in male exercise science students at a public urban university located in the Midwest. It is possible that these expectations that are propagated by the media are in fact a factor in the development of MD in young men.

## Literature Review

### Muscle Dysmorphia

Muscle dysmorphia is classified as a subtype of body dysmorphic disorder (BDD). The *Diagnostic and Statistical Manual of Mental Disorders, 5th ed.* or DSM–5 (American Psychiatric Association [APA], 2013) defines BDD as a preoccupation with one or more perceived defects in physical appearance that are not observable by others. To be diagnosed, the individual must have engaged in some repetitive behaviors in response to their perceived defects in physical appearance. Their preoccupation with their physical appearance also must cause clinically significant distress or impairment. Their concerns with their physical appearance are also not better described as concerns of body fat or weight (APA, 2013).

When looking specifically at muscle dysmorphia, the individual is focused on their body's lack of size and muscularity (APA, 2013). The prevalence of muscle dysmorphia is relatively unknown. The prevalence of BDD is documented as 1.4-2.2% of men. It is estimated that 22% of BDD cases meet the criteria for muscle dysmorphia (Blashill et al., 2020). This study compared patients diagnosed with BDD and muscle dysmorphia, comparing the symptoms of each disorder and their severity. It was found that patients diagnosed with MD are more prone to violence, more emotionally restricted, and more focused on portraying themselves as masculine. It was also found that patients with muscle dysmorphia experience more severe symptoms than those with BDD. Some symptoms and characteristics of people who are suffering from muscle dysmorphia include spending more than 3 hours per day thinking about becoming more muscular, believing that they cannot control their weightlifting habits, engaging in diet and exercise practices that interfere with their daily lives, avoiding social settings due to muscularity concerns, and engaging in activities with the goal of hiding their bodies, such as wearing loose-

fitting clothing (Tod et al., 2016). It can be difficult to identify individuals with muscle dysmorphia as many of the activities that are used to identify muscle dysmorphia can be difficult to label as pathological. It can be difficult to distinguish muscle-building activity from standard physical activity (Tod et al., 2016).

The nature of MD as a disorder has been widely debated. It has been argued that it should be classified as a body dysmorphic disorder, an eating disorder, an obsessive-compulsive disorder, and a behavioral addiction. The DSM-5 classification refers to it as a subtype of body dysmorphic disorder, but there has been discourse calling to change that classification. An article by Foster et al., (2015) argues that MD is better classified as an addiction to body image. Muscle dysmorphia is defined by the individual's obsession with their body size and muscularity. The individual continually engages in repetitive harmful behaviors to maintain a misconstrued body image. Foster et al., (2015) claims that the act of attempting to maintain a certain body image is an addictive behavior and may consist of a variety of different actions.

There are many significant clinical symptoms and comorbidities related to muscle dysmorphia since it is a disorder that is defined by the presence of multiple manifestations (Leone et al., 2005). The preoccupation with appearance is the defining feature of body dysmorphic disorder, and for muscle dysmorphia it is the preoccupation with the size/muscularity of the body that defines the condition. These preoccupations occur for 3-8 hours per day on average (Phillips & Hollander, 2008). The presence of delusions is another symptom of muscle dysmorphia. Individuals with muscle dysmorphia experience delusions regarding the size and muscularity of their bodies. They also experience delusions regarding how they are viewed by others. They may believe that other people are constantly looking at them and judging them based on their muscularity (Phillips & Hollander, 2008). Another common symptom is the

performance of compulsive behaviors. Some examples of these behaviors include constant comparing to others, constant self-checking in mirrors, and constantly changing clothing. In a study conducted by Pope et al. (2005) it was shown that individuals who have been diagnosed with MD are more likely to engage in multiple compulsive behaviors than individuals diagnosed with body dysmorphic disorder. Individuals diagnosed with MD are also more likely to engage in dangerous behaviors such as drug abuse (Pope et al., 2005). Muscle dysmorphia is highly associated with clinical depression. It occurs in 75% of individuals diagnosed with muscle dysmorphia. Suicide rates for individuals diagnosed with muscle dysmorphia are higher than the general population and higher than other mental illnesses (Phillips & Hollander, 2008).

When looking at specific populations of men that are at risk for muscle dysmorphia, it is important to look at young men who are involved in weightlifting. It has been shown that traits of muscle dysmorphia are more prevalent in college students studying health care professions. The nature of their studies leads them to desire increased muscularity (Bo et al., 2014). It has also been shown that weightlifters are more susceptible to developing muscle dysmorphia. These individuals are likely to desire larger muscle mass despite already having significant muscle mass. These individuals are more likely to be dissatisfied with their muscularity than people who engage in other types of physical activity (Choi et al., 2002).

**Prevalence**

The prevalence of muscle dysmorphia is difficult to accurately quantify as MD is not always screened for and can go undiagnosed in many individuals. It is commonly estimated that 100,000 men in the United States suffer from muscle dysmorphia (Tod et al., 2016). It is difficult to know if this measure is accurate. It has been shown that the prevalence of muscle

dysmorphia is higher when observing bodybuilders or weightlifters compared to the general population (Tod et al., 2016).

A survey of 3,618 adolescent Australians between the ages of 11-19 years conducted by Mitchison et al., (2021) aimed to identify the prevalence of muscle dysmorphia among these individuals. The results of this study concluded that muscle dysmorphia had a prevalence of 2.2% in adolescent boys. It also showed a slight association between muscle dysmorphia and older-aged adolescents. These findings suggest that muscle dysmorphia is relatively common in young men. It is important to note that these findings may be inaccurate as the identification of muscle dysmorphia in these young men was not verified by a medical professional.

A survey focusing on men in the military and how the prevalence among that demographic compares to the general population showed that they are at a greater risk for muscle dysmorphia when compared to the general population. Thirteen percent of the men surveyed met the criteria for muscle dysmorphia, which was significantly higher than the general population rate which is stated to be 2.4% (Campagna & Bowsher, 2016). The researchers suggest that the higher rates of muscle dysmorphia in the military may be caused by societal pressure for service members to meet a certain body type (Campagna & Bowsher, 2016). The pressure to look a certain way can be a driving force in the development of muscle dysmorphia.

A study focusing on a group of Pakistani bodybuilders looked to identify the prevalence of muscle dysmorphia among bodybuilders who have been regular gym-goers for at least 2 years. This study identified that 58.3% of the individuals showed signs suggestive of muscle dysmorphia (Bashir et al., 2021).

Current literature shows one thing in common: men who feel the need to increase their muscularity are more at risk for developing muscle dysmorphia. It is possible that men who feel pressure to attain a certain physique or level of strength are inherently more at risk of developing muscle dysmorphia.

**Exercise Addiction**

Exercise addiction is one of the most observable symptoms in individuals with muscle dysmorphia. Exercise addiction can be difficult to identify, as many individuals exercise regularly, and determining when it becomes an addiction is challenging. Exercise is generally encouraged so the process of classifying when it has been taken too far can be difficult. Exercise addiction becomes pathological when it begins to cause social and physical harm to the individual performing the exercise (Szabo et al., 2015).

One of the ways that health practitioners screen for exercise addiction is by using the Exercise Addiction Inventory, which is a screening tool that asks six questions each looking into a different addiction component. The components it screens for are salience, conflict, mood modification, tolerance, withdrawal, and relapse (Griffiths et al., 2005). It uses these questions to determine if the individual is showing any signs of being addicted to exercise. The Exercise Addiction Inventory was validated in a study done by Lichtenstein and Jensen (2016). The study looked to evaluate the psychometric properties of the Exercise Addiction Inventory by presenting the screening tool to 634 CrossFit athletes. The screening tool was found to be valid when looking to identify exercise addiction (Lichtenstein & Jensen, 2016).

Another option to define exercise addiction is the DSM-5's criteria for defining dependence. An article by Freimuth et al. (2011) looks to identify exercise addiction according to

these DSM-5 criteria: tolerance, withdrawal, lack of control, intention effects, time, reduction in other activities, and continuance. These are common criteria used to determine substance dependence, and they can be used to determine exercise dependence as well. An individual is showing tolerance if they increase exercise intensity to feel a sense of accomplishment rather than to see improvements. Withdrawal can be seen if the individual experiences anxiety, irritability, or restlessness when missing exercise sessions. Lack of control refers to the inability to reduce the amount of exercise. Intention effects refer to the individual's inability to stick to a plan and consistently does more exercise than intended. Time refers to the great amount of time that the individual devotes to exercise. Reduction in other activities can be seen when other social or recreational activities are cut out of the individual's life to make more room for their exercise habits. Continuance refers to the individual continuing their exercise habits despite being aware of the negative effects that it is having on them and their life (Friemuth et al., 2011). These factors line up with the DSM-V's diagnostic criteria for substance addiction and are a good start when looking to identify exercise addiction in an individual. It is important to be able to identify exercise addiction as it is one of the common symptoms of muscle dysmorphia.

An article by Macfarlane et. al. (2016) looked to identify some features of exercise addiction. The article focuses on three major features of exercise addiction. These features are negative perfectionism, obsessive-compulsive drive, and self-worth compensation. Negative perfectionism was identified as one of the characteristics common in individuals with exercise addiction. This negative perfectionism can surface as unrealistic self-expectations or a fear of not being dedicated to an exercise program. Pressure from outside sources such as coaches and parents can instill this fear of not meeting expectations which leads to this negative perfectionism. The obsessive-compulsive drive is another feature that can be seen in individuals

with exercise addiction. This drive surfaces as an inability to take rest days and experiencing a craving for exercise. People with this feature have rigid exercise plans that cause mental and physical harm as well as detract from other portions of their lives. Self-worth compensation refers to the idea that individuals who are addicted to exercise rely on it to raise their feelings of self-worth. Individuals experience negative effects such as withdrawal when they are unable to complete their exercise (Macfarlane et al., 2016). This leads to a fear of anything that could prevent them from exercising and causing them to neglect other responsibilities in their lives.

These factors that contribute to exercise addiction are important to understand as exercise addiction is something that is common in individuals with muscle dysmorphia. These factors can overlap between the two conditions, and it is important to understand how an individual may develop an exercise addiction, as it may make the underlying cause of their muscle dysmorphia more apparent. Ultimately, muscle dysmorphia and exercise addiction are two separate conditions that feed into each other and the relationship between the two is an important one to consider.

**The Muscular Ideal**

The muscular ideal is something that is propagated by the media and is observed by young men across the world. Body image is something that is very important to young men as they develop into adults. Body image concerns for young men typically center around their muscularity. The muscular ideal that is portrayed by men in the media can be a key factor in the development of body dissatisfaction in young men, which in turn can lead to an increased risk of muscle dysmorphia. Many young men are invested in their appearance and are at high risk to develop body dissatisfaction (Vuong et al., 2021). It is important to look at how muscularity is

portrayed in the media to see if it is a factor in the development of muscle dysmorphia in young men.

Modern social media allows young people to be exposed to more unrealistic role models. A study done by Vuong et al. (2021) focused on the relationship between social media use and body dissatisfaction. This study found that there was a positive correlation between social media use and body dissatisfaction in both boys and girls. The conclusion of this study is that young men's body dissatisfaction is focused on their muscularity. A study conducted by Uchôa (2019) looked to expand upon this conclusion by focusing on the potential influence of the media on body dissatisfaction and the development of eating disorders. This study concluded that social media usage increases body dissatisfaction in men and women, and body dissatisfaction increases the likelihood of an individual developing an eating disorder (Uchôa et al., 2019). The results of these studies support the theory that social media propagates unrealistic expectations toward young men which leads them to compare themselves to the men on these platforms. These comparisons lead to young men becoming dissatisfied with their bodies and in particular their muscularity.

One of the root causes of body dissatisfaction for many young men is the desire to impress their peers. The portrayal of muscularity in the media skews the view of what a realistic physique is for young men. A study conducted by de Vries et al. (2016) focused on how social media usage and peer feedback can relate to body dissatisfaction in adolescents. This study recognized that body dissatisfaction through social media use is not due solely to the exposure to these unrealistic appearances but is instead due to the related conversations had with peers (de Vries et al., 2016).

It has been established that the use of social media can lead to body dissatisfaction, but further research is needed to understand what content on these sites is responsible. Social media sites have a wide range of content from a variety of sources. A literature review by Goodyear (2020) investigated the different types of content on social media sites and the pros and cons of social media on health. This review mentions how social media use can create an environment that promotes personal judgment, ridicule, and criticism. It also is stated that young people can become addicted to positive feedback given by peers. This addiction can lead to the individual undergoing drastic measures to keep their body in a state that they perceive as acceptable. This could include excessive exercise, diet plans, or even steroid usage. The review mentioned content from sources such as celebrities as potentially harmful to young people. Celebrities often portray unrealistic bodies which can negatively affect an individual's body image. It suggests that more positive health-related resources be promoted on these sites rather than content focused on the showing of unrealistic physiques.

A study by Wang et al. (2019) looked at how body dissatisfaction develops over the lifespan from adolescence to middle adulthood. This study viewed how body dissatisfaction changed over the course of 15 years. It was found that body dissatisfaction remained relatively constant from adolescence to middle adulthood. This adds further validity to studies focused on body dissatisfaction in adolescents, as the same levels of body dissatisfaction are likely to continue into adulthood and beyond. It is important to understand how social media can influence the development of body dissatisfaction in young men, as body dissatisfaction is a key contributor to muscle dysmorphia.

**Disordered Eating**

Disordered eating is a major symptom of muscle dysmorphia and having a warped perception of what is an attainable level of muscularity. An article by Griffiths et al. (2013) examined the relationship between a drive for increased muscularity and disordered eating. Typical eating habits of an individual looking to increase muscularity involve increasing protein intake, increasing liquid calorie intake, and restricting intake of fats and carbohydrates. Disordered eating habits can be characterized by interrupting everyday activities to eat frequently, continuing to eat despite feeling full, eating as frequently as every 2 hours, and consuming appearance-enhancing drugs such as steroids or other substances. This article points out the lack of recognition these habits receive as disordered and that they should be recognized as potentially harmful. These eating habits are indicative of muscle dysmorphia and need to be recognized as such to allow for better treatment of the disorder (Cafri et al., 2005).

**Treatment of Muscle Dysmorphia**

Muscle dysmorphia is a complex disorder and can be difficult to treat effectively. The first step in effectively treating muscle dysmorphia is identifying the disorder in an individual. As stated previously, it is difficult to identify muscle dysmorphia in a person because it can be hard to differentiate between healthy individuals and those suffering from the psychological symptoms of muscle dysmorphia. There is no specific treatment method that has been proven to effectively treat muscle dysmorphia. A study by Leone et al. (2005) focused on some of the potential treatment methods for muscle dysmorphia. This study identifies antidepressant medications as an effective treatment method for severe muscle dysmorphia. It also suggests the use of cognitive-behavioral therapy to treat muscle dysmorphia. However, these measures are not recommended for milder cases. The article recommends rethinking the way we view men's

body image as a society to encourage men to be open with their feelings (Leone et al., 2005). This is an important step in preventing and rehabilitating muscle dysmorphia.

### Muscle Dysmorphic Disorder Inventory

The Muscle Dysmorphic Disorder Inventory (MDDI) is a screening tool used to classify if an individual is at risk of muscle dysmorphia (Hildebrandt et al., 2004). It consists of 13 different questions with responses measured on a 1-5 Likert scale. It focuses on three factors that are present in individuals at risk for muscle dysmorphia: a drive for size, a functional impairment, and an appearance intolerance. Specific questions are correlated with each of these three specific factors. The MDDI has been validated in multiple countries and was used in this study to assess the presence of symptoms associated the muscle dysmorphia and determine their risk of developing the disorder.

## Methodology

This survey was approved by the author's university Institutional Review Board. This survey was created in Microsoft Forms (Microsoft Corporation, Redmond, Washington), version 2203, and distributed via email through an advising portal on the university's learning platform (Desire to Learn, Kitchener, Ontario) to all exercise science students currently enrolled at The University of Akron (N=326). A written informed consent form was not collected, as all responses were anonymous. The informed consent was included in the recruitment email, and it was made clear to participants that beginning the survey would act as completion of the informed consent. The recruitment email and consent form are included as Appendix A. The goal of this research was to target males, so the initial question asked for gender and ended the survey if any answer other than male was selected. Age and exercise history were also collected to allow for further grouping of the results. Reminder emails were sent twice, once one week before the

survey closed and once three days before the survey closed, and responses were collected for two weeks.

The prevalence of muscle dysmorphia among respondents was assessed by computing the percent of participants who classify as at-risk for muscle dysmorphia. Responses were sorted based on the number of times per week an individual exercises per week and for how long (in months or years) the individual had been exercising habitually. The options for frequency of exercise per week were 1-2 days per week, 3-4 days per week, and 5-7 days per week. The options for how long an individual had been exercising were less than 1 year, 1-3 years, or greater than 3 or more years.

The survey used in this study is a combination of the Muscle Dysmorphic Disorder Inventory (Hildebrandt et al., 2004). and questions crafted by the author. The MDDI is included to identify individuals at risk of muscle dysmorphia, and the additional questions are included to gauge the participant's feelings regarding the portrayal of muscularity in the media. Responses to each of these 20 questions were scored on a 1 to 5 Likert scale, where 1 was equivalent to strongly disagree and 5 was equivalent to strongly agree. These results were analyzed using Microsoft Excel (Microsoft Corporation, Redmond WA), version 2203. The mean was taken of all twenty (20) responses to each of twenty (20) questions. A complete copy of the survey used can be found in Appendix B.

Questions 1-12 are related to the assessment of muscle dysmorphia symptoms. Risk levels can be determined by summing the responses on the Likert scale for this section of the survey. Previous research has used the value of >39 as the threshold for a classification of "at risk of muscle dysmorphia" (Zeeck et al., 2018) Questions 13-20 are related to the individual's view of muscularity in the media and how they may be influenced by it. The higher the sum of

these eight responses was, the more focus that said individual placed on men in the media. The threshold for an individual being more likely to have been influenced by the media is >24. The sums of the responses to questions 1-12 and 13-20 were plotted against each other and then compared with a line of best fit. The correlation coefficient was evaluated to determine the strength of any positive or negative correlation between the two variables.

## Results

A total of 25 responses were received over the course of the two weeks that the survey was live online. Five responses were from females were discarded. This left a total of 20 responses for analysis. All respondents (*n*=20) were between the ages of 18 and 30 years. All respondents reported exercising habitually for at least 1 year. Seventy-five percent (*n*=15) have been exercising for 3 years or more. Two (10%) of the respondents indicated that they exercise 1-2 days per week. Six (30%) of the respondents claim to exercise 3-4 days per week. The majority (60%) of respondents said they exercise 5-7 days per week, with 12 individuals selecting that option. Demographic information is summarized in Table 1.

**Table 1.**

*Demographic Information of male respondents ages 18-30 years old*

| Times per week exercising | Number of years exercising |
|---|---|
| 1-2 days = 2 | Less than 1 year =0 |
| 3-4 days =6 | 1-3 years = 5 |
| 5-7 days =12 | 3 or more years = 15 |

All 20 individuals responded to 20 questions on a 1-5 Likert scale with 1 being strongly disagree and 5 being strongly agree. The mean score of each question was recorded and are shown below in Table 2.

**Table 2.**

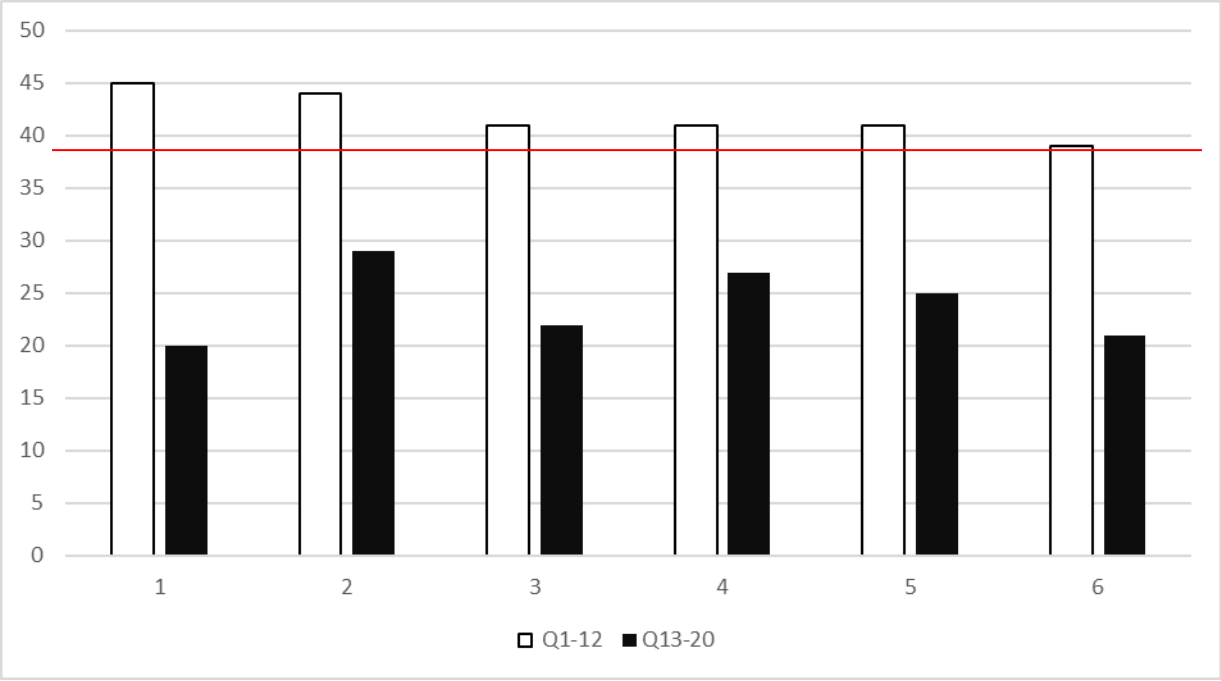
*Mean Scores (n=20) for Survey Questions (Appendix B)*

| | |
|---|---|
| I think my body is too skinny/slender | **2.50** |
| I wear loose clothing so that people can't see my body | **1.65** |
| I hate my body | **2.10** |
| I wish I could be heavier | **3.05** |
| I find my chest to be too small | **3.47** |
| I think my legs are too thin | **3.15** |
| I wish my arms were stronger | **3.85** |
| I am embarrassed to let people see me without a shirt | **1.95** |
| I feel anxious when I miss one or more days of exercise | **3.35** |
| I cancel social activities because of my exercise schedule | **2.30** |
| I feel depressed when I miss one or more days of exercise | **2.90** |
| I miss opportunities to meet new people because of my workout schedule | **2.20** |
| Sum of Q1-12 | **32.15** |
| The male physique portrayed in the media is attainable | **3.40** |
| I exercise with the goal of impressing others | **2.15** |
| I compare my muscle mass to men in the media | **3.05** |
| I was inspired to exercise by men in the media | **2.30** |
| I compare my body fat to men in the media | **2.60** |
| I compare my strength to men in the media | **3.15** |

| | |
|---|---|
| I struggle to attain the muscularity of men in the media | **3.05** |
| Most muscular men in the media do not use steroids | **1.90** |
| Sum of Q13-20 | **21.60** |

The sums of the responses to questions 1-12 and 13-20 were used to determine the individual's risk of muscle dysmorphia as well as the likelihood of the individual being influenced by social expectations. A sum of >39 on questions 1-12 indicated an increased risk of muscle dysmorphia. A sum of >24 on questions 13-20 indicated an increased likelihood that the individual was influenced by social expectations. There were six (6) individuals who were at increased risk for muscle dysmorphia out of the twenty (20) responses. Data for participants at increased risk for muscle dysmorphia is shown below in Figure 1.

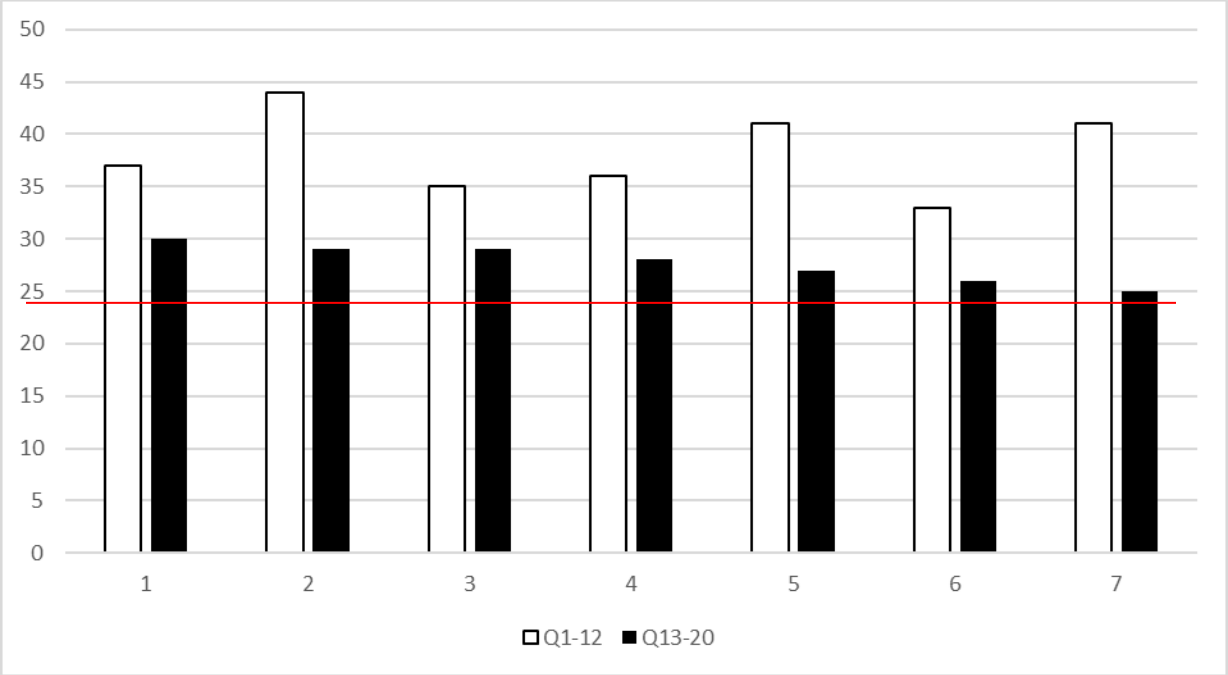
**Figure 1.**
*Individuals who are at increased risk of muscle dysmorphia*



There were seven (7) participants at increased risk of being influenced by social expectations based on scoring >24 on questions 13-20. Data for participants at increased risk of being influenced by social expectations is shown below in Figure 2.

**Figure 2.**

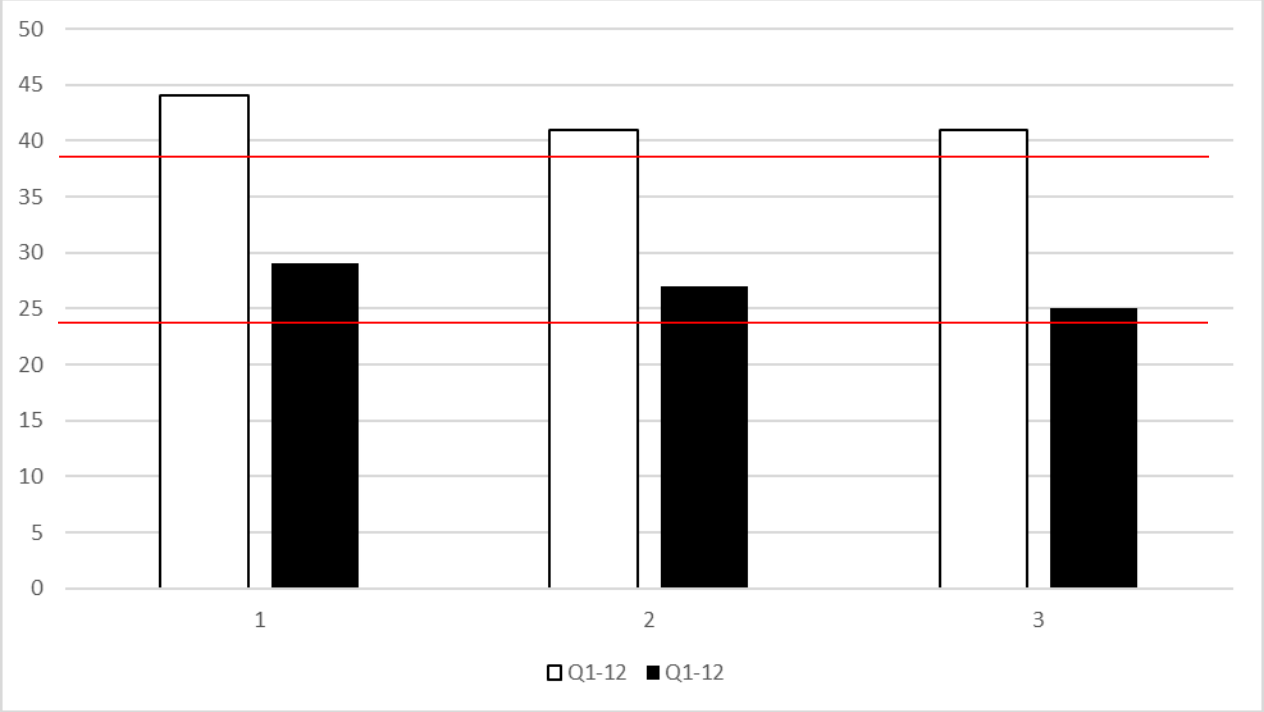
*Individuals at increased risk of being influenced by social expectations*




There were three (3) individuals at increased risk for both muscle dysmorphia and being influenced by social expectations. Data for these participants is shown below in Figure 3.

**Figure 3.**

*Individuals at risk of both muscle dysmorphia and being influenced by social expectations*




This data shows that 30% of the participants are at increased risk of muscle dysmorphia, and 35% of participants are at increased risk of being influenced by social expectations. Fifteen percent of participants are at increased risk for both muscle dysmorphia and being influenced by social expectations.

The results were also sorted based on the number of days per week the individuals exercise per week and for how many years they have been exercising. Data sorted based on these parameters can be seen below in Table 3.

**Table 3.**

*Averages sorted based on exercise history*

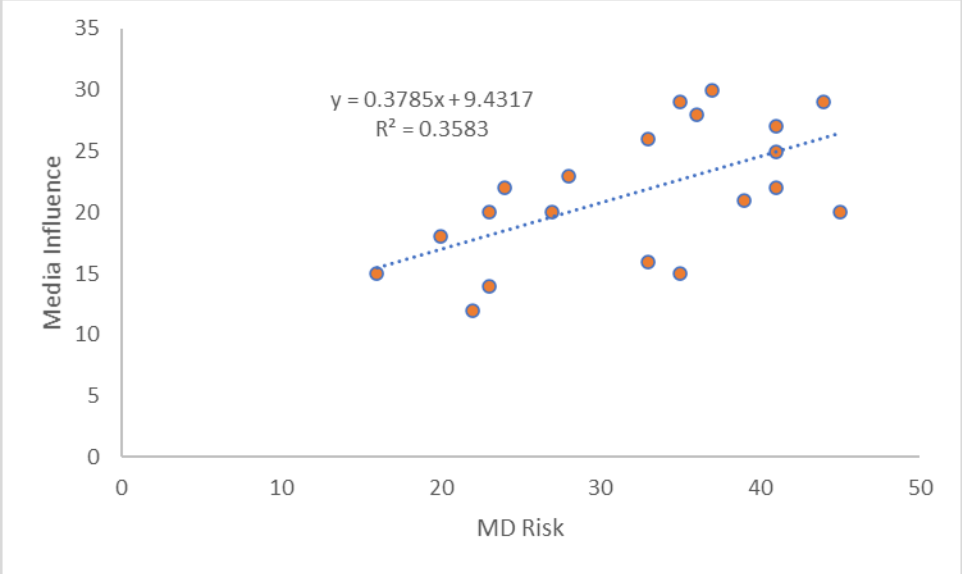
| | Q1-12 | Q13-20 |
|---|---|---|
| 5-7 days per week | 35.42 | 22.75 |
| 3-4 days per week | 30.33 | 21.00 |
| 1-2 days per week | 18.00 | 16.50 |
| 3 or more years | 33.27 | 21.80 |
| 1-3 years | 28.80 | 21.00 |

Data suggests that individuals who exercise more often and have been exercising for a longer period of time are at a higher risk of developing muscle dysmorphia and being influenced by social expectations.

A line of best fit was used to identify any correlation between the influence of social expectations and the increased risk of muscle dysmorphia. The sums of Q1-12 and Q13-20 were plotted against each other, and a line of best fit was created to identify correlation. The graph containing the line of best fit can be seen below in Figure 4.

**Figure 4.**

*Line of Best Fit between MD Risk Score (Q1-12) and Media Influence Score (Q13-20)*




The line of best fit produced a correlation coefficient of 0.3583. A value of 1 would be indicative of a strong positive correlation and a value of -1 would be indicative of a strong negative correlation. Zero would show no correlation. The value of 0.3583 is indicative of a small positive correlation between the amount of influence the media has on an individual and the risk of developing muscle dysmorphia.

## Discussion

The goal of this study was to identify any correlation between the influence social expectations have on an individual, and the risk of developing muscle dysmorphia. Identifying the prevalence of muscle dysmorphia in male exercise science students at The University of Akron was also a goal of the study. Out of the twenty men surveyed, six of them are at increased risk of muscle dysmorphia. This equates to a prevalence of 30%, which is much greater than the rate for the general population which is 2.4% (Campagna & Bowsher, 2016). This great disparity may be attributed to the small sample size. It may also be attributed to the target population. One

of the study hypotheses was that male exercise science students would be more at risk for MD, and this data supports that hypothesis. Exercise science students are more likely to be active exercisers due to the nature of the field. Individuals who are looking to become exercise professionals are likely to be enthusiastic about exercise themselves. Twelve (60%) of the twenty participants exercise 5-7 days per week, and fifteen (75%) of the twenty have been exercising for 3 or more years. Excessive exercise habits can lead to an exercise addiction, which is a hallmark symptom of muscle dysmorphia. While it is unlikely the difference is as great as the data suggests due to the small sample size, it is likely that male exercise science students experience muscle dysmorphia at a greater rate than the general population.

The data was also examined for a significant correlation between the risk of muscle dysmorphia and the influence that social expectations have had on those individuals. Based on the survey, 35% ($n$=7) of the individuals were significantly influenced by unrealistic social expectations. Fifteen percent of the participants experience both an increased risk for muscle dysmorphia and have been significantly influenced by social expectations. The results of the line-of-best-fit analysis produced a correlation coefficient of 0.3583. Our data suggests that there may in fact be a correlation between these two variables, but these results are not conclusive enough to state that there is a definite correlation.

The most significant limitation to this study is the sample size. A sample size of twenty was well below the target sample size of 100. More conclusive results may have been obtained if the sample size had been closer to the target sample size. Future research protocols should include the use of creative strategies to increase participation. An additional strategy for increasing the sample size of the target population (males studying exercise science) is to

distribute the survey within multiple universities and increasing the time for data collection. Increasing the sample size is essential to producing more accurate results.

Future research is necessary to further understand how social expectations affect the risk of muscle dysmorphia. This future research is important to understand how unrealistic social expectations are affecting young men. Muscle dysmorphia is a difficult condition to understand and diagnose, which makes studying the causes of MD difficult as well. Future research in a clinical setting with patients who have been clinically diagnosed with muscle dysmorphia may be effective to study the effect unrealistic social expectations have had on individuals with MD. Ultimately, this study has confirmed that more research needs to be done to understand the causes of muscle dysmorphia, which may contribute to the development of effective treatment options.

This research project has had a large impact on me personally. Muscle dysmorphia is a disorder that is of great significance to me. I am grateful to have had the opportunity to study this disorder. I believe that the way muscularity is portrayed in the media is unrealistic and can be harmful to young men. It was interesting to take an in-depth look at how muscularity is portrayed and how it is linked to MD. I wish I would have been able to collect more responses and come to a more significant conclusion. I have enjoyed the research process and feel that it has helped me develop skills that I will use in my future studies. Overall, this project has been a good conclusion to my undergraduate studies, and I am grateful for the experience.

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# Appendix A

## Recruitment Email/ Informed Consent

You are invited to participate in a research project being conducted by Quinten Garver, an undergraduate student in the School of Exercise & Nutrition Sciences at the University of Akron. The title of the project is The Influence of Social Expectations on Muscle Dysmorphia in College-Age Males Studying Exercise Science. The purpose of this survey is to explore the role social expectations play in the development of muscle dysmorphia for college-age males. The desired sample size for this study is 100 participants. This survey is being sent to male exercise science students at the University of Akron. This study does not aim to have any positive or negative effects on the participants. Stress may occur when asked to think about your body image. The University of Akron's Counseling and Testing Center can be reached at 330-972-7082. You will receive no direct benefit from this study, but your participation will help us better understand the relationship between Muscle Dysmorphia and social expectations. If you choose to be in the study, you will complete an anonymous, web-based survey. This survey will help us learn more about the role social expectations play in the development of muscle dysmorphia for college-age males. The survey will take about 5-10 minutes to complete. You can skip questions that you do not want to answer or stop the survey at any time. Being in this study is optional. You may disregard this email if you do not wish to participate. The survey will not collect any identifiable information, and no one will be able to connect your responses to you. All responses will be stored on Quinten Garver's computer until the completion of the study when they will then be deleted. Data will only be accessed by Quinten Garver and Melissa Smith. Your anonymity is further protected by not asking you to sign and return a consent form. Beginning the survey will serve as your consent. If you wish, please print this email for future reference. If

you have any questions about this study, you may contact Quinten Garver at qmg5@uakron.edu, or my advisor, Melissa Smith, at mgsmith@uakron.edu or 330-972-4905. This project has been reviewed and approved by The University of Akron Institutional Review Board. If you have any questions about your rights as a research participant, you may call the IRB at 330-972-7666. If you wish to participate in this study, click the link below to start the survey.

## Appendix B

**Survey**

Q1: I think my body is too skinny/slender

Q2: I wear loose clothing so that people can't see my body

Q3: I hate my body

Q4: I wish I could be heavier

Q5: I find my chest to be too small

Q6: I think my legs are too thin

Q7: I wish my arms were stronger

Q8: I am embarrassed to let people see me without a shirt

Q9: I feel anxious when I miss one or more days of exercise

Q10: I cancel social activities because of my exercise schedule

Q11: I feel depressed when I miss one or more days of exercise

Q12: I miss opportunities to meet new people because of my workout schedule

Q13: The male physique portrayed in the media is attainable

Q14: I exercise with the goal of impressing others

Q15: I compare my muscle mass to men in the media

Q16: I was inspired to exercise by men in the media

Q17: I compare my body fat to men in the media

Q18: I compare my strength to men in the media

Q19: I struggle to attain the muscularity of men in the media

Q20: Most muscular men in the media do not use steroids