

# Disordered Eating & Body Image of Current and Former Athletes in a Pandemic - What Can We Learn From COVID-19 to Support Athletes Through Transitions?

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## Research article

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# Abstract

## Background

The COVID-19 pandemic has seen worsened mental health as a result of lockdowns, isolation and changes to sociocultural functioning. The postponement of the Tokyo 2020 Olympics is representative of global cancellations of sporting events, reduced facility access and support restrictions that have affected both current and former athletes psychological wellbeing. This study aimed to determine whether current (n=93) and former (n=111) athletes experienced worsened body image, relationship with food or eating disorder symptomatology during acute COVID-19 transitions.

## Methods

The study was a Convergent Mixed Methods design whereby qualitative content analysis was collected and analysed simultaneously with quantitative cross-sectional data using the EAT-26 and self-report COVID-19 questions. Data were collected from April until May 2020 to capture data pertaining to transitions related to the pandemic and included individuals across 41 different individual and team sports from club to international competition levels.

## Results

There was a surge in disordered eating behaviours and cognitions in current and former athletes as a result of the early COVID-19 response. Eating disorders were suggested to occur in 21.1% of participants (18% current athletes n=17, 25% former athletes (n=26)). There was a significant difference between males and females ( $p=0.018$ ,  $r=0.17$ ), but interestingly no differences between groups from individual vs team sports, type of sporting category (endurance, antigravitational, ball sport, power, technical and aesthetic) or level of competition (club, state, national or international). 34.8% (n=69) self-reported worsened body image and 32.8% (n=65) self-reported a worsened food relationship directly from COVID-19. Qualitative analysis indicated that disordered eating occurred predominantly in the form of body preoccupation, inhibitory food control, fear of body composition changes and binge eating.

## Conclusions

This study indicates that transitions in COVID-19 have worsened food-body relationships in current and former athletes and must be treated as an at-risk time for eating disorder development. We suggest that resources are allocated appropriately to assist athletes foster psychologically positive food and body relationships through COVID-19 transitions. This study makes practice suggestions in supporting athletes to manage control, seek support, adapt and accept change and promote connection and variety through athletic transitions.

## Plain English Summary

The current study looked to explore how current and former athletes' disordered eating behaviours and cognitions had been affected in response to the COVID-19 pandemic. We found that disordered eating had worsened in both population groups and was described through increases to food preoccupation, control, binge eating, dietary restriction and fear of body composition change. This study offers suggestions on how to best support current and former athletes through COVID-19 transitions, further relating these findings to athletic transitions such as retirement, injury, pregnancy and illness.

## 1. Background

On the 12<sup>th</sup> of March, 2020 the World Health Organisation declared a global pandemic on the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), otherwise known as COVID-19. At the time of data collection there had been over 4,000,000 cases and over 280,000 confirmed deaths globally (1). The pandemic has since seen over 68,000,000 cases and 1,500,000 deaths with colossal changes to social functioning, employment, the closure of schools and venues, the ceasing

of domestic and international travel and the widespread cancellation of events (1). In the month of March in the United States of America (USA) over 10 million people filed for unemployment, with many of these people simultaneously losing access to their health insurance (2). In May in the USA, 49.8 million people reported they hadn't been able to work the previous month due to COVID-19 related business closures or lost business (3). The impact of the pandemic is anticipated to have significant and longstanding consequences over the coming years.

Whilst the acute response to COVID-19 has been to control and manage the pandemic, access to broader healthcare has been limited and deprioritised (4). Further to this, quarantines, lockdowns, and physical or social isolation have been related to negative psychological affect despite their necessity to control the pandemic (5-8). Eating disorder (ED) treatment facilities have seen prolonged waitlists, increased referrals and an increased help seeking through immediate support resources (9). Increased restriction, binge eating, purging and dysfunctional exercise was seen in an Australian ED population whereas the general population experienced increases to restrictive practices and binge eating, but less overall exercise (10). Haddad, Zakhour (11) saw that a higher fear of COVID-19 or increased physical activity were associated with a higher dietary restraint whilst fear of COVID-19, higher anxiety and engaging in physical exercise were associated with higher shape and weight concerns. Keel, Gomez (12) described how perceived weight gain or the fear of gaining the "quarantine 15 [pounds]", rather than actual weight gain, was strongly related to concerns of weight, shape and eating. Castellini, Cassioli (13) reported an increase in objective binge eating and compensatory exercise in those who already had ED diagnostics, whereas no difference in these practices in healthy controls. Given that EDs are said to occur at significantly higher rates in athletes than in the general population, we suspect that current and former athletes are an especially at risk population group in these times of uncertainty (14).

Athletes more specifically, have seen changes with the closure of gyms, training facilities, group training and the cancellation of competitions. The largest change for elite athletes comes with the postponement of the 2020 Tokyo Olympic Games to be now pushed back until 2021. An Olympic year in an elite athletes' calendar is unlike any other. As it only comes around every 4 years and includes many different sports, the psychological preparation and emphasis on the event is significant (15, 16). The initial response to the change by athletes varied, from relief to frustration and has undoubtedly changed many times since the announcement on March 24, 2020 (16, 17). In times of stress, athletes have risen to the challenge, employing the use of positive orientation, rational thinking, social supports, time management, training harder and ignoring the stressor as coping strategies (18). A systematic literature review explored how athletes who deviated from plans or structure, performed worse than those who were able to stick to their plans or make adjustments when needed (15). Further to this good athlete-coach relationships, positive and cohesive training environments and the support from family and friends were key to an athletes success (15). Whilst most athletes globally find themselves in unpredictable and uncertain situations due to COVID-19, it will be presumable that the athletes who are resilient and adaptable will be the ones to best cope with these unforeseen circumstances.

Given that the COVID-19 pandemic has and is constantly changing, in terms of lockdowns and restrictions, literature studying retired athletes offers an insight into how athletes respond to transitions and significant moments of change (19). Stephan & Bilard (20) demonstrated that retiring athletes experienced worsening body image in the acute transition (from 1 to 4.5 months) from sport, and Papathomas, Petrie & Plateau (21) described that 55% of former athletes were dissatisfied with their body weight. Whilst Plateau, Petrie & Papathomas (22) explored how former athletes found acceptance in their athletic transition through Intuitive Eating and the reconnection with their bodies' needs and hunger-fullness cues. Further to these athletic transitions as times of risk; events such as injury, illness, social/relationship issues, illness of family members, burnout and loss of a coach are all risk factors for the development of disordered eating (DE) or poor mental health, and are of particular interest given the changes due to the pandemic (23, 24). These studies direct our attention to how current and former athletes respond to transitions and give us reason to suggest that they are at risk of worsening body image and DE throughout this unforeseen and unpredictable time.

Due to the psychosocial effects of food insecurity, unemployment, healthcare inaccessibility, social isolation, weight gain fear-mongering, worsened psychological affects and changes to sporting operations there is good evidence to hypothesise

that current and former athletes will see worsened food-body relationships and high prevalence rates of EDs as an acute response to the COVID-19 pandemic. As such, for this convergent mixed methods study we ask the following research question; how have current and former athletes' acute relationship with food and body been affected as a result of a pandemic? The research question aims to be answered in the following two ways: (a) determine whether current and former athletes experienced worsened body image, relationship with food, and ED symptomatology during COVID-19, and (b) explore how current and former athletes' relationship with food and body has been affected as a result of COVID-19.

## 2. Methods

### 2.1. Study Context

For the purpose of this study, participant data was collected mostly from Australia, USA and New Zealand and as such will be contextualised through these countries. Throughout the time of data collection, 29th April to 7th May 2020, these 3 countries were under similar lockdown restrictions; encouraging citizens to remain at home under unless for highly essential purposes, engage in social distancing and increased hygiene measures. Lockdowns and restricted travel had been enforced since January 2020 with many changes expecting to take months and potentially years to slowly ease out of. On the 7th of May, Australia had 6,896 cases and 97 confirmed deaths, New Zealand had 1,489 cases and 21 confirmed deaths, and the USA had more than 1.2 million cases and over 75,000 deaths as a result of SARS-CoV-2 (1).

### 2.2. Study Design & Procedure

This study is a cross sectional convergent mixed methods (CMM) design; where both qualitative and quantitative data were combined to elucidate new knowledge through interpretations (25). A CMM study aims to obtain and analyse information from both datasets independently to further understand the research question and then combine both datasets to fill the limitations of both methods (26). Convergence and divergence of results can occur when both datasets are merged. That is, the quantitative and qualitative results may conflict with one another or they may mimic one another, but ultimately they offer greater insights to the research topic than just quantitative or qualitative methods alone (25). Qualitative and quantitative data were collected concurrently via Qualtrics, an online survey program (27). A specific type of CMM variant will be used to describe the methodology of this study; the questionnaire variant. The questionnaire variant form of CMM is when both open and closed-ended questions are asked in a survey and are used to validate and explain one another (25).

Participants were asked demographic questions in addition to the Eating Attitudes Test-26 (EAT-26) (28), 2 self-report change questions and 4 open ended questions regarding COVID-19. The EAT-26 is a 26 item scale assessing EDs. The scale includes 3 subscales: (1) Dieting, avoidance of fattening foods and a preoccupation with body change, (2) Bulimia and food preoccupation, obsessive thoughts about food and bulimia nervosa related behaviours, (3) Oral control, the self-control related with eating in order to control the body (28). The EAT-26 criterion validity suggests that a score greater than 20 is indicative of an ED (discriminant function: 82.6%) (28). The internal consistency for the scale is 0.9 in the general population (28) and has ranged between 0.51–0.96 in studies involving athlete populations (29). In this study population (n = 204) the alpha was established to be 0.92.

Whilst we wanted to know the state of EDs in current and former athletes during a pandemic, we also wanted to be able to explain to a greater degree why an individual's relationship with food and body may have changed during this time. The continuum of DE and body image is complex (30) and as such we want to capture more information than just the percentage of those engaging in ED symptomatology to offer greater clinical application for those supporting such individuals. Two self-reported questions were asked to categorise qualitative open ended responses that included; (1) *How has your body image changed since COVID-19?* (2) *How has your relationship with food changed since COVID-19?* A 5 point Likert scale categorised responses (much worse, somewhat worse, about the same, somewhat better and much better). Participants were asked to *describe why this has been the case* for both questions through open ended responses. Participants were then asked, *As a current or former athlete, has anything made things more challenging for you over this*

*time*, with the option to describe in an open ended format the challenges they may have faced. An additional open ended response further asked, *is there anything you would like to add related to how COVID-19 has affected you?*

## **2.3. Recruitment & Data Collection**

The study was given Institutional ethics approval (Swinburne University Ethics Committee: SHR: 2019/113) and participants consented prior to participation. Data were collected online between 29th April and 7th May, 2020 through convenience sampling; a type of random sampling that is limited in its ability to be generalisable unless participant numbers are significant (31). It was advertised to current and former athletes globally through social media (Twitter, Instagram, Facebook) and to relevant sporting organisations and health professionals. Social media enabled others to share or retweet the original posts which assisted in promoting the flyers over the 9 days.

A current or former 'athlete' was self-determined by the individual regarding their athletic identity. Athletic identity is the degree to which an individual identifies as an athlete or with an athletic role (32). Studies engaging athletes often focus on elite athletes and as such, the perspectives of many who strongly identify as athletes across a range of competition levels are often excluded. Current and former athletes from all range of sports were encouraged, including dancers which are often ambiguously categorised.

## **2.4. Participant Characteristics**

The sample consisted of 204 current ( $n = 93$ ) and former ( $n = 111$ ) athletes aged between 18–63 years ( $M = 27.0$ ,  $SD = 8.1$ ). This consisted of 14.2% males ( $n = 29$ ) and 85.8% females ( $n = 175$ ). Athletic status was used to categorise current and former athletes with 78 current female athletes, 15 current male athletes, 97 former female athletes and 14 former male athletes. Amongst the former athletes; 4.5% ( $n = 9$ ) retired in the last year, 10.3% ( $n = 21$ ) 1–2 years ago, 16.7% ( $n = 34$ ) 2–5 years ago, 16.2% ( $n = 33$ ) 5–10 years ago and 6.9% ( $n = 14$ ) retired over 10 years ago. Further demographic data is represented in Table 1.

Table 1  
Additional Demographic Information

<b>Education</b>	<b>Bachelor, Masters or Doctorate Qualification</b>	<b>79.5% (n = 162)</b>		
<b>Employment</b>	Full time employment	47.5% (n = 97)		
<b>Nationality</b>	Australia	60.8% (n = 124)	Canada	1.5% (n = 3)
	USA	26.5% (n = 54)	UK	1.5% (n = 3)
	New Zealand	4.4% (n = 9)	Other	3.4% (n = 7)*
	Ireland	2% (n = 4)		
<b>Sport</b>	Track & Field	37.7% (n = 77)	Gymnastics	2.5% (n = 5)
	Basketball	5.4% (n = 11)	Fencing	2.5% (n = 5)
	Triathlon	4.9% (n = 10)	Ultra/Trail Running	2.5% (n = 5)
	Netball	4.4% (n = 9)	Volleyball	2.0% (n = 4)
	Rowing	3.9% (n = 8)	Australian Football	2.0% (n = 4)
	Tennis	3.4% (n = 7)	Soccer	2.0% (n = 4)
	Swimming	2.9% (n = 6)	Other	20.6% (n = 42)**
	Field Hockey	2.9% (n = 6)		
<b>Sporting Categories</b>	Endurance	42.6% (n = 87)	Weight Class	5.4% (n = 11)
	Ball Sports	27.9% (n = 57)	Technical	3.9% (n = 8)
	Power	11.3% (n = 23)	Antigravitational	1.5% (n = 3)
	Aesthetic	6.9% (n = 14)	Other	0.5% (n = 1)
<b>Team vs Individual Sport</b>	Team	32.8% (n = 67)	Individual	67.2% (n = 137)
<b>Highest Competition Level</b>	Club	17.2% (n = 35)	National	38.2% (n = 78)
	State	15.7% (n = 32)	International	28.9% (n = 59)
<b>Previous Eating Disorder (n = 67)</b>	Anorexia Nervosa	14.2% (n = 29)	Binge Eating Disorder	3.4% (n = 7)
	Bulimia Nervosa	5.4% (n = 11)	Other	5.4% (n = 11)
	Orthorexia Nervosa	4.4% (n = 9)		

<b>Education</b>	<b>Bachelor, Masters or Doctorate Qualification</b>	<b>79.5% (n = 162)</b>		
<b>Current Eating Disorder</b>	No	89% (n = 182)	Yes	10.7% (n = 22) <sup>***</sup>

\* Other nationalities included: Argentina (n = 1); Hong Kong (n = 1); Israel (n = 1); Mexico (n = 1); Netherlands (n = 1); Poland (n = 1); South Africa (n = 1)

\*\* Other sports included: Softball (n = 3); Ballet (n = 3); Cycling (n = 3); Equestrian (n = 2); Jump rope (n = 2); Kayaking (n = 2); Lacrosse (n = 2); Muay Thai (n = 2); Rock Climbing (n = 2); Rugby (n = 2); Synchronised Swimming (n = 2); Taekwondo (n = 2); Weightlifting (n = 1); American Football (n = 1); Bobsleigh (n = 1); Bodybuilding (n = 1); Jiu Jitsu (n = 1); Goalball (n = 1); Ice Hockey (n = 1); Irish Dancing (n = 1); Kick Boxing (n = 1); Boxing (n = 1); Powerlifting (n = 1); Roller Skating (n = 1); Surf Lifesaving (n = 1); Touch Football (n = 1); Water Polo (n = 1)

\*\*\* Current female athletes (n = 10), former female athletes (n = 12), current/former male athletes (n = 0)

## 2.3. Data Analysis

Quantitative data were analysed using SPSS v.25 (33) with a p value < 0.05 considered as a significant result. EAT-26 data was distributed non-parametrically through a Kolmogorov-Smirnov test. Due to non-parametricity, Chi squares, Mann-Whitney U, and Kruskal Wallis H tests were conducted, all assumptions were met for these results to be validated. Kruskal Wallis tests were corrected with a Bonferroni correction ( $\alpha = 0.05$ ).

Content analysis was used to analyse the qualitative data to explore the contextual meaning of what was being said (34, 35). Content analysis utilises the process of coding and categorising text into themes, similar to other methods of qualitative analysis. For the purpose of this CMM study we utilised conventional content analysis that aims to describe a phenomenon and is often used to describe individuals attitudes or thoughts of such a phenomenon, in this instance (a) body image, (b) relationship with food and (c) challenges arising during COVID-19 (34).

Credibility and rigor in qualitative methods are of importance in developing the reproducibility and reliability of results in sports psychology (36, 37). Two researchers (GB & LH) immersed themselves in the text by reading it multiple times. Investigator triangulation was achieved through independent coding and evaluation of text impressions (38). Codes were developed for each response category (worse, about the same, better and challenges arisen) and have been presented as such in the results. An inter-rater reliability consensus of 87.5% of codes occurred. For any discrepancies, codes were discussed and merged to encompass both of the researchers' interpretations. Further credibility was established through peer-debriefing between GB & LH's thoughts and impressions of the text, and additionally through the researchers prolonged engagement in the sporting sector (36). GB identifies as a woman and is a former national level 800 m runner, competing in athletics for upwards of 15 years, and LH is a current elite international female 1500 m runner, having participated in athletics for 17 years. Both researchers reflexively represented the two participant categories of (a) former athlete and (b) current athlete. As a matter of reflexivity, both researchers were able to interpret the qualitative text from the position of their respective lived experiences, enriching the meaning made from the results. The final codes have been represented through a tree diagram to explain the main reasons as to why current and former athletes have been affected over this time period. Impressions have been discussed and explored alongside recommendations in the discussion (34, 39)

## 3. Results

### 3.1. Convergent Mixed Methods Results

Both qualitative and quantitative results have been combined to provide insight into the interrelationship of how COVID-19 has affected current and former athletes' relationship with food and their body (Figure 1).

Current and former athletes found that changes to their exercise and training were the most significant factor in affecting both their perception of their body and their relationship with food over this time. Reduced training or exercise meant energy balance shifts with subsequent food changes. This was described to result in increased binges, restriction, guilt, shame or increased/decreased control over food. Many described body composition changes that created negative affect towards their body shape and size. Even in the absence of body changes, the fear of anticipatory body changes was enough to indicate a worsened body image. The coding tree summarises the main influences that affected changes to body image and relationship with food in Figure 2.

### 3.2.1. Worsened Body Image

A worsened body image was often conflated with body changes, including weight gain or muscle loss, due to exercise and energy balance changes. For many current and former athletes, the ability to exercise was intricately related to the way they perceived their body. Less exercise, training or competitions ensured that participants were fearful of weight gain. It was noted that for current athletes, loss of muscle mass in addition to fat gain was a further stressor as one current athlete described, *"I am so much less able to exercise. This means I'm worried that I'm losing fitness, and the more I lose fitness and strength, the more my body changes...I'm feeling sad about being bigger than others..."* One current weight class athlete reported that their preoccupation with energy and calories had increased with the fear of their body composition changing, *"I usually train 4 hrs a day and never have to think about weight or calories I burn unless I'm cutting weight for a competition. I am usually very lean when training and working full time. I exercise every day now, but my energy expenditure is way lower and I love food. I eat well and have a little treat every night and I'm fit, but my body has changed and I'm not as lean as usual, which is a little uncomfortable."*

A current athlete with an ED described how their symptomatology was worse at the start of isolation, *"My eating disorder voice has gotten significantly louder. However, it was a lot worse at the beginning of our stay at home order (March 13<sup>th</sup>) than now."* For others, a changing environment and being at home created body preoccupation and greater comparison to others through social media, as one current athlete reported, *"I've been way more conscious of how I dislike some features and way more obsessive, especially with how many posts are on social media."* For a former athlete, video programs such as Zoom, created additional body dissatisfaction and stress, *"I hate attending Zoom meetings because I compare myself to others on the screen."* A former athlete noticed body changes and was trying to accept these changes but finding it hard to find clothes to fit their body, *"I've gained weight and I have very few clothes left that fit comfortably. Online shopping is hard when you don't know your new size and you can't picture clothes that look good on skinny models looking good on me. Gaining a significant amount of weight has challenged who I feel I am and that itself makes me feel guilty."*

### 3.2.2. Worsened Relationship with Food

A worsened relationship with food was often attributed to a perceived lack of control or loss of control. Control was commonly used to describe how individual's relationship with food had changed. It was described to be both a coping strategy in addition to something that participants felt they had lost. In an uncertain and unprecedented time, both current and former athletes described attempting to control food to provide a sense of agency over their life, as one former athlete described, *"In this chaotic time I have found food to be a pillar of control - so I feel as if I am exerting greater control over aspects of my diet which is getting somewhat stricter than normal."* For a current athlete, they felt that their eating had become out of their control, leading to a complex psychological affect of guilt, shame and stress, *"I feel now that I have less willpower to control what I eat. This means I am eating more rubbish, and feeling worse about it afterwards. Before the pandemic I used more energy worrying about what I ate, but at least some of it was productive energy, i.e. I would do meal planning etc. Now my mental health has diminished I have less energy to do that so I am eating more junk, and feeling the effects in my body (both real physical effects and worry about gaining weight etc) but feeling pretty powerless to do anything about it. The lack of ability to exercise and play my sport worsens these feelings."*

Others reported that their living situations had changed or that they were not coping with either (a) an increase to access of food at home, or (b) a decrease to food access in their communities. A former athlete described the change to the way they shop for food and the affect this has had on their relationship with food, *"I have a lot of anxiety around food and am out of my routine. I have to shop for a couple of weeks at a time instead of getting fresh veg every few days. I can't have meals with friends so I sometimes just can't be bothered dealing with the anxiety of food just for myself."* A current athlete described moving back home had reduced their food options, *"...coming home from college and not having the freedom of my own food choices."* Whilst a former athlete described how they found the increased access to food at home stressful, *"I am living back home with my parents and have access to a wider variety of food, including 'bad' foods. I feel like I lack the control to be in this environment."*

### 3.3.3. Additional COVID-19 Challenges

Current and athletes differed in their reliance on peers, family and friends. For current athletes it was the loss of support that these people were able to give to them that made COVID-19 more challenging whereas with former athletes it was the loss of socialising through sport and social events that felt challenging. The change in exercise/training/competitions was of the most significance for both current and former athletes. A current athlete described how changes to their exercise has highlighted their motivation behind their sport, *"I am not able to train all the time. Which is something I use to make sure I don't gain weight."* Former athletes described that exercise was previously used a tool to assist their mental health. As one participant described, *"I can't access a pool to train. I don't compete anymore but still feel most safe in the water and deal with my anxiety by swimming, it's made it so much harder not to be able to swim."*

For another current athlete, this time was made more challenging as it gave additional time to reflect on some of the more nuanced challenges they are facing in their sport, *"I have quite limited access to training resources at the moment. I already felt like a bit of an impostor because I go to big international competitions but I represent a country which is very weak in my sport, and I'm an amateur who works full time, and I can't train as much or to the same level as professional athletes from other countries and this is reflected in my body, my sports ability, and my results. I already felt kind of unworthy of going to these competitions, like I'm not a real athlete (I thought twice about even doing this survey). Now I can see Instagram stories etc both from people I know personally representing other countries and people I only know by reputation, and see how much harder they are training than I am, it worsens those feelings of inadequacy."* Another current athlete reflected on how the postponement of the Olympics has increased the financial pressure they found themselves under, *"[This] has extended the amount of time I have to financially support myself before the Olympics, while training at a high level. Have had to seek further employment to get myself through an extra year."*

Other athletes described that their reliance on social media in the absence of physical competition had increased. Sites such as Strava were used to compare training distance and speed as a way to increase pressure and social comparison, *"Comparison to others exercise has increased with more time to look on Strava"* in addition to, *"It seems like everyone is working out more. Seeing their workout summaries on Strava makes me feel guilty about how I look and the shape I'm in."* For others, sport without physical competition was no longer worth the time and energy, *"[It's challenging] finding ways to be active without being super 'competitive.' For me, if I'm not 'training' hard it's a waste of time."*

During the pandemic, some participants described how they were finding it challenging to transition or retire from sport, whilst others described the difference between this and other times of transition such as injuries. A current athlete described, *"COVID-19 has affected my general mental health quite a lot through isolation and anxiety. I think this is having as much of an effect on my fitness and relationship with my body as anything else. It's different from an injury because at least with an injury you can train the rest of your body, and other people know how to help. Everyone is going through this at the same time so there isn't a stable support to lean on. I feel like everyone else is staying on top of things and I am not."* For one former athlete, they reflected on how their previous sporting transitions has given them a level of resilience to cope with unprecedented times such as this, *"My sporting resilience in the face of uncertainty has actually done me a world of good."*

*Sitting with the unknown of selection has taught me to sit with uncertainty and control why [sic: what] I can control - and remove my focus from the rest."*

#### 3.2.4. Improved or Maintained Body Image

For those who reported their body image was about the same, it was not uncommon to describe a paradox where both positive and negative aspects of body image were described. A current athlete explored the duality of feeling both negative and positive about their body, *"[I'm] feeling less fit but also being more patient and understanding with myself."* Another current athlete described this paradox through their body image being conflated with their body composition, *"I've lost weight but some [of] it has been muscle, so I feel neutral."* This paradox was further described by a former athlete, *"It's been a constant struggle and I've still be able to exercise and eat healthy."* For others, they found that their body image had not changed due to the previous work they have overcome in improving their relationship with their body. A former athlete described how actively working on their body image in athletic transitions has provided resilience in these difficult times, *"I've done extensive body image and food relationship work since retiring from sport. These unprecedented circumstances have proven that the work I have done has proven beneficial. I don't feel fear for my body changing, although I know had this been a couple year ago, it would have consumed my thoughts."*

A current athlete experienced improved body image through gratitude and appreciation for what their body is capable of since being injured, *"[I've] been able to train consistently without distractions and injuries again. And therefore appreciate what my body is doing for me and allowing me to train."* A former athlete felt their body image had improved despite exercising less as they experienced gratitude for their health and less social comparison, *"I'm not as active working from home, however, I am grateful for my body and how I have been able to stay healthy during this time. I am not able to physically compare myself to people every day which has helped me too surprisingly."* For others, being removed from their sporting cultures or social groups meant they experienced less objectification and body shaming, *"[I'm] not so preoccupied with looks because I'm by myself and nobody can see my body to judge it."* This was experienced by both current and former athletes, *"...I don't have to see people in public and worry about how they perceive me."*

#### 3.2.5. Improved or Maintained Relationship with Food

For participants who experienced a maintained relationship with food, it was not always a positive maintenance. A current athlete described how reduced access to their supermarket had provided temporary relief to symptoms aligned with binge eating disorder despite the underlying psychological features remaining unaddressed, *"Limiting grocery shopping to once or twice a week prevents me from going to the supermarket late in the evening if a binge urge kicks in, I make sure to only shop when I'm in a healthy food mindset so I don't buy anything I would normally binge on, therefore there isn't any of my go to binge foods in the house even if the urge does arrive."* A former athlete described the battle they continue to face with their relationship with food, *"I still think about food and I still monitor my body and I can tell I am not exercising but I also don't give a s\*\*t. It feels like I will NEVER get to a good place with food so why bother?"* A current athlete further described the paradox of both positive and negative aspects of their relationship with food coexisting, *"I would say I go through phases of eating really well then have a bad day where I over eat."* For others, it was a time to reflect on how far they had come in healing their relationship with food and were grateful for its consistency through this transient time, *"I have worked extremely hard to repair my relationship with food, and I am seeing how steadfast that work is proving to be. I feel free and flexible with my nutrition which is a very good thing considering grocery stores have empty aisles and foods I usually buy are not always available. Thankfully, I feel confident to make other food decisions that will still nourish my body well without guilt or fear."*

An athlete described how the pandemic had afforded them more time to learn about nutrition and have gratitude for their food, *"I have spent more time cooking meals from scratch. Finding meals that are healthy and learning about the nutritional benefits."* This was further explored in a participant's appreciation for the resources they were able to access, *"I am grateful that we have resources in Australia to be able to make nutritious meals in this situation."* A former athlete described using

this time for growth and learning to reconnect with their body cues through intuitive eating, “I’m trying to use this time to ditch dieting mentality and try intuitive eating. Earlier during lockdown I was very hard on myself but I’m easing up.” A change in living environment was a positive change for a former athlete who found their parents role modelled a more balanced diet, “Living with parents recently, who eat a more balanced diet than I do.”

### 3.3.1. Quantitative Descriptive Statistics & EAT-26 Reliability

Descriptive data on continuous variables including; age, height, weight, total EAT-26 scores and subscales are described in Table 2. with corresponding internal consistency reliability statistics (Cronbach’s alpha). The reliability of the EAT-26 total score for the total sample population (n=204) was 0.92 and 0.83 for para athletes (n=4). Values above 0.7 are considered acceptable (40).

Table 2. Descriptive Statistics for Sex and Athletics Status with EAT-26 total score and subscale scores

	Current Athletes Females (n=78)		Former Athletes Females (n=97)		Current Athletes Males (n=15)		Former Athletes Males (n=14)	
	M (SD)	<i>alpha</i>	M (SD)	<i>alpha</i>	M (SD)	<i>alpha</i>	M (SD)	<i>alpha</i>
Age	25.0 (8.5) <sup>a</sup>		27.0 (7.4) <sup>a</sup>		26.0 (11.2)		29.5 (6.5)	
Height	166.5 (7.3) <sup>b</sup>		169.0 (7.5) <sup>c</sup>		176.0 (8.8) <sup>b</sup>		181.0 (7.5) <sup>c</sup>	
Weight	61.0 (9.1) <sup>a,b</sup>		65.0 (12.5) <sup>a,c</sup>		68.0 (10.2) <sup>b,d</sup>		83.0 (11.1) <sup>c,d</sup>	
EAT-26 Total Score	7.5 (13.4) <sup>b</sup>	0.93	6.0 (11.8)	0.91	2.0 (7.5) <sup>b</sup>	0.88	3.5 (3.0)	0.45
Dieting Subscale	5.0 (8.8) <sup>b</sup>	0.92	4.0 (7.6)	0.88	1.0 (7.5) <sup>b</sup>	0.78	2.0 (3.1)	0.75
Bulimia Subscale	1.0 (3.0)	0.70	0.0 (3.1) <sup>c</sup>	0.81	0.0 (2.3)	0.86	0.0 (0.6) <sup>c</sup>	0.45
Oral Control Subscale	1.0 (3.4)	0.76	1.0 (2.5)	0.58	2.0 (1.1)	*	2.0 (1.1)	*

<sup>a</sup> Significant difference between females

<sup>b</sup> Significant difference between current athletes

<sup>c</sup> Significant difference between former athletes

<sup>d</sup> Significant difference between males

\* Violates reliability model assumptions (inadequate sample size)

Non-parametric Independent Samples Mann Whitney U tests were conducted between groups, significance was indicated by  $p < 0.05$ . There was a significant difference between current male and female athletes in the total EAT-26 score (Males:  $M=2.0$ ,  $n=15$ ; Females:  $M=7.5$ ,  $n=78$ ),  $U=781$ ,  $z=2.06$ ,  $p=0.04$ ,  $r=0.21$ ; and in the dieting subscale (Males:  $M=1.0$ ,  $n=15$ ; Females:  $M=5.0$ ,  $n=78$ ),  $U=850$ ,  $z=2.78$ ,  $p=0.005$ ,  $r=0.29$ .

21.1% of participants had EAT-26 scores suggestive of an ED, there was a significant difference between males and females (Males: M=3.0, n=29; Females: M=6.0, n=198), U=3234, z=2.37, p=0.018, r=0.17, but no significant difference between groups of athletic status, individual vs team sports, type of sport or level of competition (Table 3.). The difference between males and females was only significant through the dieting subscale scores (Males: M=1.0, n=29; Females: M=5.0, n=175), U=3508, z=3.32, p=0.001, r=0.23.

Table 3. Descriptive Statistics of EAT-26 Scores Indicative of an Eating Disorder

<b>Athletic Status (n=204)</b>	18% current athletes (n=17)	25% former athletes (n=26)
<b>Individual vs Team Sport (n=204)</b>	19% individual athletes (n=26)	25% team sport athletes (n=17)
<b>Type of Sport (n=204)</b>	16% endurance athletes (n=14)	0% antigravitational athletes (n=0)
	19% ball sport athletes (n=11)	14% power athletes (n=8)
	36% aesthetic athletes (n=4)	25% technical athletes (n=2)
<b>Highest Level of Competition (n=204)</b>	26% club level athletes (n=9)	16% state level athletes (n=5)
	26% national level athletes (n=20)	15% international athletes (n=9)

### 3.3.3. COVID-19 Responses & EAT-26

A series of categorical COVID-19 questions were asked regarding relationship with food, body image and challenges over this time. The results are presented in Table 4 and indicate the percentages of respondents for each category (worse/same/better; yes/no). EAT-26 total score was compared to these response groups and significant differences assessed. Kruskal-Wallis H Tests were conducted to assess non-parametric one-way between groups analysis of variance between COVID-19 questions 1 and 2, EAT-26 scores and athletic categories. Mann-Whitney U Tests were conducted for question 3, as it only had 2 categorical response options. Bonferroni adjustments were applied when comparing multiple groups.

Table 4. COVID-19 Categorical Responses vs. Athletic Status and Sex and difference within response groups

		All participants (n=198)		Current Athletes Females (n=77)		Former Athletes Females (n=93)		Current Athletes Males (n=14)		Former Athletes Males (n=14)	
		% , n	EAT-26 M (SD)	% , n	EAT-26 M (SD)	% , n	EAT-26 M (SD)	% , n	EAT-26 M (SD)	% , n	EAT-26 M (SD)
1. How has your body image changed since COVID-19?	Worse	34.8 (n=69)	<b>9.0 (13.4)<sup>a</sup></b>	42.9 (n=33)	8.0 (14.4)	34.4 (n=32)	<b>15.0 (12.9)<sup>b</sup></b>	14.3 (n=2)	15.0 (12.7)	14.3 (n=2)	4.0 (2.8)
	Same	50.5 (n=100)	<b>5.0 (11.4)<sup>a</sup></b>	42.9 (n=33)	7.0 (13.6)	52.7 (n=49)	<b>4.0 (11.1)<sup>b</sup></b>	71.4 (n=10)	2.0 (6.9)	57.1 (n=8)	3.5 (2.7)
	Better	14.6 (n=29)	5.0 (8.1)	14.3 (n=11)	8.0 (10.7)	12.9 (n=12)	5.0 (5.9)	14.3 (n=2)	2.0 (1.4)	28.6 (n=4)	4.5 (4.0)
2. How has your relationship with food changed since COVID-19?	Worse	32.8 (n=65)	<b>13.0 (14.5)<sup>a</sup></b>	46.8 (n=36)	10.5 (14.3)	28.0 (n=26)	<b>21.0 (14.6)<sup>b</sup></b>	14.3 (n=2)	13.0 (15.6)	7.1 (n=1)	9.0 (0.0)
	Same	53.0 (n=105)	<b>5.0 (9.7)<sup>a</sup></b>	41.6 (n=32)	6.0 (13.3)	55.9 (n=52)	<b>4.0 (7.9)<sup>b</sup></b>	71.4 (n=10)	4.0 (6.7)	78.6 (n=11)	3.0 (2.0)
	Better	14.1 (n=28)	7.5 (9.1)	11.7 (n=9)	7.0 (11.5)	16.1 (n=15)	8.0 (8.5)	14.3 (n=2)	1.5 (0.7)	14.3 (n=2)	8.5 (3.5)
3. Has anything made things more challenging for you over this time?	Yes	62.6 (n=124)	6.0 (12.7)	76.6 (n=59)	7.0 (13.2)	54.8 (n=51)	<b>11.0 (13.0)<sup>b</sup></b>	57.1 (n=8)	2.0 (1.8)	42.9 (n=6)	2.0 (3.7)
	No	37.4 (n=74)	6.0 (10.6)	23.4 (n=18)	9.0 (14.5)	45.2 (n=42)	<b>4.0 (9.0)<sup>b</sup></b>	42.9 (n=6)	11.0 (9.8)	57.1 (n=8)	4.5 (2.5)

<sup>a</sup> p<0.05 for within group difference for all participants

<sup>b</sup> p<0.05 for within group difference for former female athletes

### 3.3.4. Body Image Changes During COVID-19

When looking at all participants, there was a significant difference in EAT-26 total score between those who perceived their body image to have gotten worse as a result of COVID-19 and those who perceived it to have stayed the same,  $\chi^2(2,198) = 8.01, p=0.018$ . The group who perceived worsened body image had a higher median EAT-26 score (M=9.0, SD=13.4) compared to the group who perceived it stayed the same (M=5.0, SD=11.4). This was also the case in former female athletes,  $\chi^2(2,81) = 7.93, p=0.019$  with those experiencing worsened body image having a higher median EAT-26 (M=15.0, SD=12.0) compared to the group who perceived their body image stayed the same (M=4.0, SD=11.1). There were no significant differences between categories in current female athletes, current male athletes or former male athletes. There was also no significant differences across rows in their EAT-26 scores.

### 3.3.5. Relationship with Food Changes During COVID-19

When looking at all participants, there was a significant difference in EAT-26 total score between those who perceived their relationship with food to have gotten worse during COVID-19 compared to those who perceived it stayed the same,  $\chi^2(2,198) = 15.5, p=0.000$ . The group who perceived their relationship with food to have gotten worse had a higher median EAT-26 score ( $M=13.0, SD=14.5$ ) compared to the group who perceived it stayed the same ( $M=5.0, SD=9.7$ ). This was also seen in former female athletes,  $\chi^2(2,81) = 15.8, p=0.000$ , with those experiencing worsened body image having a higher median EAT-26 ( $M=21.0, SD=14.6$ ) compared to the group who perceived body image stayed the same ( $M=4.0, SD=7.9$ ). There were no significant differences between categories in current female athletes, current male athletes or former male athletes. There were no significant differences between categories in current female athletes, current male athletes or former male athletes. There was also no significant differences across rows in their EAT-26 scores.

### 3.3.6. Other Results

Former female athletes who perceived things had been made more challenging during COVID-19 had significantly higher EAT-26 scores ( $M=11.0, SD=13.0$ ) than those who did not perceive COVID-19 to be challenging ( $M=4.0, SD=9.0$ ),  $U=813, z=-1.997, p=0.046, r=0.21$ . No other group had significant differences. There were no significant differences between highest sporting competition (club, state, national, international) and EAT-26 scores ( $p=0.428$ ); last competition for former athletes (1 month to 30 years +) and EAT-26 scores ( $p=0.937$ ); sporting categories (endurance, antigravitational, ball sports, power, weight class, aesthetic, technical, other) and EAT-26 scores in current ( $p=0.149$ ) or former athletes ( $p=0.519$ ). Additionally, both body image ( $p=0.673$ ) and relationship with food ( $p=0.386$ ), current athletes were not significantly different between EAT-26 scores and response categories.

## Discussion

There has been a surge in DE behaviours and cognitions in current and former athletes as a result of the early COVID-19 response. Questions remain about the effect this transition has had on clinical ED rates specifically and the temporal trajectory of such DE states. What this study does indicate is that transitions, such as the COVID-19 pandemic response, for current and former athletes are a particular at-risk time for DE development that may be a significant contributing factor to clinical ED development. Increased body preoccupation was often linked to increased control of food in a self-perpetuating cycle; leading back to increased body preoccupation and worsened body image. This phenomenon was often related to restrict-binge cycles and a worsened relationship with food. This study has indicated that athletes require specific support in times of transition, such as during the COVID-19 pandemic, due to the close proximity of current and former athletes body composition and physical appearance to their body image and psychological wellbeing.

Former female athletes who experienced worsening DE are suspected to be the most likely group developing clinical EDs from the pandemic transitions. What is particularly interesting about those who self-reported their food-relationship had worsened, was that the average score of 21.1 fares higher than the EAT-26 cut-off indicative of ED pathology (EAT score  $>20$ ) (28). This was not seen in current females nor current/former male athletes. Thus it is hypothesised that female former athletes are the most likely in this population to have developed new ED pathology as a result of acute COVID-19 restrictions. Qualitatively, exerting cognitive control over food was the most commonly indicated factor that female former athletes referred to for developing a worsened food relationship. Control amongst an individual's food relationship appeared to represent itself paradoxically. Control materialised in a self-perpetuating cycle such that behavioural attempts to control food resulted in reinforced cognitions whereby food ends up preoccupying the individual leading back to further cognitive control, and so on. For former athletes inhibitory control appeared to be described around food behaviours, whereas for current athletes control was described related to exercise practices in order to regulate body composition. Similar to Haddad, Zakhour (11) the relationship between exercise and DE or body image concern appeared to be altered through the pandemic. Inhibitory control has a role in maintaining DE and more specifically in athletes it can function to enhance performance focus (41, 42). It appears that in this study inhibitory control may play a role in modulating stress in such an uncertain transition as the COVID-19 pandemic.

Changes to movement, training, physical activity and energy burning was frequently cited to negatively affect the way that participants related to their body. For former athletes, body image concerns were related to changes in weight or body shape. Whereas for current athletes it was often a fear of altered body composition either through gain of fat or loss of muscle. Body composition changes to current athletes was intricately linked to fitness components; a change in body composition was said to signify a fear of compromised performance ability. Further to this what was most interesting amongst participants was that irrespective of whether the body had actually changed or not, it was the fear of change that substantially indicated a worsened body image. Keel, Gomez (12) further described that in the absence of any weight changes, undergraduate students described their bodies changing significantly. This indicates the significance of the fear of body composition change and its relationship to DE cognitions and practices.

Body image is an ambiguous and broad term that can mean a number of things to any one individual (43). Throughout this content analysis, body image was primarily interpreted by participants as relating to their physical appearance or the physical attributes of one's body rather than the way they cognitively, emotionally or functionally related to their body (43). Some did mention how they felt emotionally towards their body, but it still centred the emotional response to changes of physical attributes e.g. I feel sad because I have gained weight. A literature review by Buckley, Hall (19) described how former athletes feel a sense of loss and "body grief" around body changes in times of transitions, particularly athletic retirement. This is suspected to occur when an individual throughout their athletic career develops a sense of athletic identity that encompasses their physical appearance. Thus, changes to their body shape, weight and composition can indicate a loss of that identity and sense of self (19). This grief, fear, loss, dissatisfaction and negative affect relating to the body is suggested to provide an ideal psychological foundation for ED development (19, 44, 45).

There appears to be a relatively large number of participants that have ED pathology (21.1%, n=43) in this population group, yet 49% of these individuals (n=21) had not received an official ED diagnosis. The body image and food relationship had worsened in > 30% of participants suggests that a large proportion of these individuals have developed worsened ED symptomatology during the acute pandemic response. The results remain inconclusive however, in the absence of a longitudinal study or of quality comparable epidemiological prevalence rates of ED in current and former athletes. Considering that the prevalence of EDs in athletes varies widely from 2-42% depending on the type of sport, gender and study rigour (46), it is difficult to understand how 21.1% in this participant group compares to typical rates in athlete populations. There are no comparable quantitative studies relating to former athletes (19), and thus this study is of particular interest as it demonstrates comparable ED pathology rates between current and former athletes, the first study of its kind to demonstrate so. The only prevalence study of former athletes indicated 0.4% of former rowers, wrestlers, boxers and judokas demonstrated ED pathology (47)

## 5.2. What have we learnt about athletic transitions?

By studying those who experienced both adaptive and maladaptive responses to their food-body relationship we have been able to draw conclusions that are relevant to navigating future athletic transitions such as retirement, pregnancy, injury and illness. Detailed below is a table describing the findings that have influenced the food-body relationship (Table 5). The first column detail what has been transient and unique to COVID-19, whereas the second column demonstrates the findings from this study that are analogous with athletic transitions.

Table 5. The factors that influence the food-body relationship in athletes through COVID-19 and in more generalised athletic transitions

COVID-19 Specific Transitions	Generalised Athletic Transitions
<ul style="list-style-type: none"> <li>§ Changes to physical environment</li> <li>§ Increased comparison through social media</li> <li>§ Changes to food security; including panic buying and fluctuating food access</li> <li>§ Boredom eating</li> <li>§ Reduced access to physical activity; including access to facilities or time allowed outside due to lockdowns</li> </ul>	<ul style="list-style-type: none"> <li>§ Increased body preoccupation</li> <li>§ Attempts to control food as a surrogate to control life changes</li> <li>§ Changes to appetite</li> <li>§ Reduced training and physical exercise</li> <li>§ Routine and lifestyle changes</li> <li>§ Body composition changes; including changes to muscle mass and fat percentage</li> <li>§ Altered mental health state; including a change to identify and self-perception</li> <li>§ Loss of motivation or direction</li> </ul>

Six key areas (Figure 3.) have been developed from the study findings as practice principles for those engaging with current and former athletes to assist in these transitions. These principles take into consideration ED prevention and have utilised the adaptive findings that participants described when their food-body relationship improved over this transition.

### 5.3. Limitations

This study was conducted in the early stages of the international COVID-19 response and was designed to capture how athletes past and present relate to food and their bodies in transitions. The study population was limited by the male participant numbers (n=29) and the subsequent variability of their EAT-26 reliability (0.45-0.88). To date there is no ED tool that has been developed with current and former male athletes at the forefront and as such, measurements are limited by their capacity to capture the phenomenon in such population groups. Further limitations include subjectivity surrounding the self-report questions and the open interpretations of the qualitative questions. The qualitative interpretations of “body image” and were unidimensional and primarily related to physical appearance despite the quality and breadth of information provided by participants. Further semi-structured interviews or focus groups would have been useful to capture nuance and tease out the complex and multidimensional experience of athletes’ relationship to their bodies.

Self-report questions require a level of psychological insight to be able to accurately capture an individual’s state. The findings of this study may be limited by the insight the participants had into what body image was and/or their personal interpretation of their food relationship. Individuals who come from sporting populations that normalise DE may also find that their insight into their condition is compromised based on their relative comparisons to their peers (48-50). The prevalence of EDs in endurance, aesthetic, leanness-emphasising and weight class sports are said to have consistently higher rates of EDs compared to other sporting categories (14, 46, 51, 52). This sample was derived from a population where 42.6% (n=87) identified as endurance athletes and may be contributing to higher levels of EDs as a representative sample of mixed sports.

These results are by no means generalisable for all current and former athletes experiencing changes relevant to the COVID-19 pandemic. Every country, sport and individual has vastly different socioeconomic and geopolitical circumstances. For instance, endurance runners have largely been able to train unaffected in many countries, whereas swimmers or team sport

athletes have faced significant barriers to train or perform their sport at all with the closure of pools and facilities (53). For other individuals COVID-19 has meant the end of their sporting career with widespread collegiate team cuts seen in the USA (54, 55). Some athletes have been able to find light in the darkness, develop resilience, new meanings and thrive in this time, whereas other athletes have been battling new challenges that have surfaced; particularly related to mental health, isolation and fitness deconditioning (56-58).

## Conclusions

A large number of current and former athletes have experienced worsened body image and disordered eating as a result of the acute COVID-19 pandemic response. This study highlights the importance of prevention efforts in sporting sectors to allocate funding and specialised support towards reducing body related anxiety, paradoxical food control, and maladaptive exercise management in times of transitions. We encourage future research to investigate the longitudinal and long term effects of this negative transition on these at risk populations for ED development; both current and former athletes.

## Abbreviations

CMM - Convergent Mixed Methods

COVID-19 - Severe Acute Respiratory Syndrome Coronavirus 2

DE – Disordered Eating

EAT-26 – Eating Attitudes Test-26

ED - Eating Disorder

SARS-CoV-2 - Severe Acute Respiratory Syndrome Coronavirus 2

USA – United States of America

## Declarations

**Ethical Approval and Consent to Participate:** Participants of this study provided informed consent to participate in this study as per the institutional ethical approval of the Swinburne University Ethics Committee: SHR 2019/113

**Consent for Publication:** Participants and all authors of this paper have provided consent for publication

**Availability of supporting data:** Interview data is available upon request in line with the Swinburne University institutional ethical approval SHR: 2019/113

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**Authors' Contributions:** GB: Conceptualisation, Methodology, Analysis, Investigation, Writing – Original Draft, Visualisation & Project Administration; LH: Analysis, Review & Editing; AL: Methodology, Writing - Review & Editing, Supervision; RB: Conceptualisation, Resources, Writing – Review & Editing, Supervision

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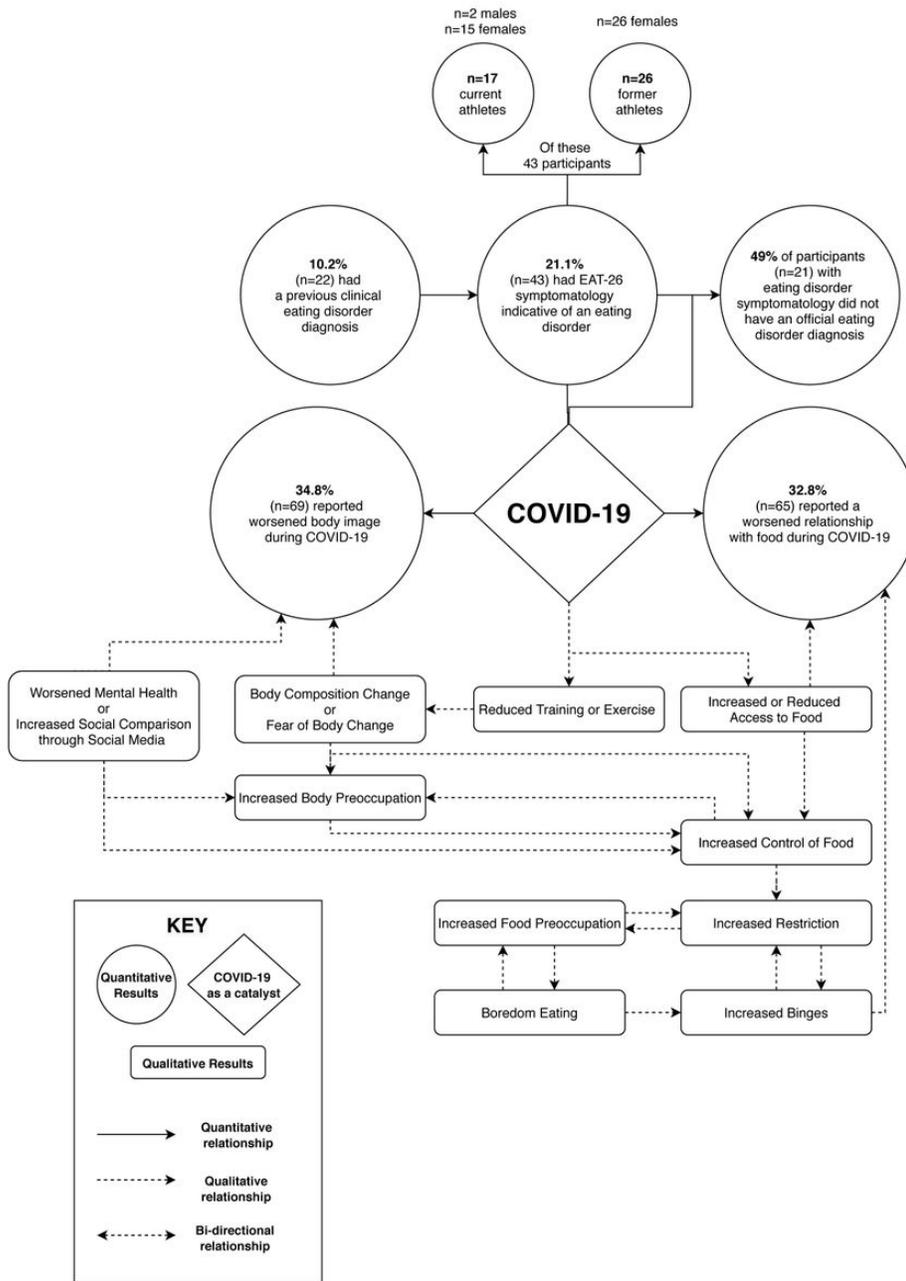
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## Figures



**Figure 1**

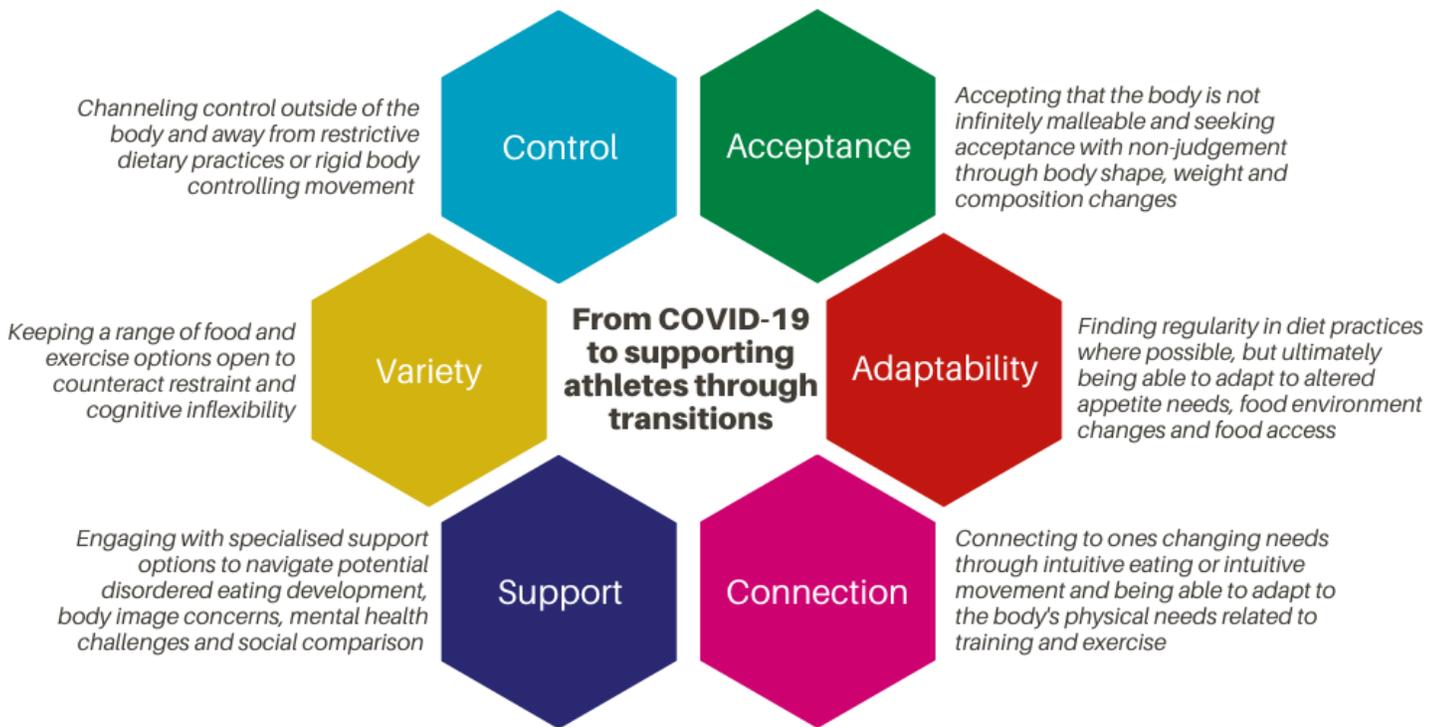
Convergent Mixed Methods Results Diagram – The convergent relationship of how COVID-19 has perceptively affected current and former athletes’ relationship with food and body image

How has your body image changed since COVID-19?	<p><b>Current Athletes</b></p> <p>Much worse or worse</p> <p>About the same</p> <p>Better or much better</p>	<p>Reduced training (n=15)            Body changes (n=11)            Worsened mental health (n=6)            Changed environment (n=6)            Eating more/stress eating (n=6)</p> <p>Training was unaffected (n=20)            No changes to lifestyle (n=7)            Diet was unaffected (n=5)</p> <p>Increased time for exercise (n=4)            Positive body changes (n=4)            Body gratitude/appreciation (n=4)</p>	<p><b>Former Athletes</b></p> <p>Much worse or worse</p> <p>About the same</p> <p>Better or much better</p>	<p>Decreased exercise (n=11)            Body changes (n=11)            Increased body awareness (n=6)            Social comparisons/expectations (n=5)            Changed environment (n=4)</p> <p>Routine/lifestyle unchanged (n=10)            Body image not a focus or concern (n=7)            Increased time for food/exercise (n=5)</p> <p>Increased exercise (n=8)            Better physical and mental health (n=5)            Less comparison/social pressure (n=4)</p>
How has your relationship with food changed since COVID-19?	<p><b>Current Athletes</b></p> <p>Much worse or worse</p> <p>About the same</p> <p>Better or much better</p>	<p>Change to food environment (n=8)            Increased binges or restriction (n=6)            Boredom eating (n=6)            Worsened mental health/stress (n=5)            Attempts to control food (n=5)</p> <p>Adjusted to exercise changes (n=7)            More time for food preparation (n=6)</p> <p>More time for food preparation (n=7)            More 'healthy eating' (n=4)            Decreased restriction/binges (n=2)</p>	<p><b>Former Athletes</b></p> <p>Much worse or worse</p> <p>About the same</p> <p>Better or much better</p>	<p>Controlling food (n=9)            Food environment/access (n=9)            Increased preoccupation (n=6)            Increased binges or restriction (n=5)            Increased 'unhealthy food' consumption (n=4)</p> <p>Adequate access to food (n=7)            Unchanged lifestyle (n=5)            Increased gratitude/appreciation (n=3)</p> <p>More time for food preparation (n=6)            More eating at home (n=4)            Intuitive eating (n=3)</p>
Has anything made things more challenging for you over this time?	<p><b>Current Athletes</b></p> <p>Yes</p>	<p>Loss of social support (n=23)            Closed facilities (n=14)            Reduced training (n=14)            Lost routine/structure (n=12)            No competitions (n=8)            Loss of motivation/identity (n=6)</p>	<p><b>Former Athletes</b></p> <p>Yes</p>	<p>Access to exercise (n=20)            Loss of social life/sport (n=8)            Decreased exercise (n=8)            Being at home (n=5)            Retirement/transition difficulties (n=4)            Change to routine/structure (n=4)</p>
Is there anything you would like to add related to how COVID-19 has affected you?	<p><b>Current Athletes</b></p> <p>Yes</p>	<p>Worsened mental health/stress (n=4)            Food has created a stress in life (n=2)            Changed motivation (n=2)            Less social connections (n=2)</p>	<p><b>Former Athletes</b></p> <p>Yes</p>	<p>Mental health changes (n=7)            Food changes/insecurity (n=4)            Job and financial insecurity (n=3)            Social isolation (n=3)</p>

**Figure 2**

Coding Tree – Qualitative content analysis results summarised by corresponding closed ended question and related response

# Practice Principles



**Figure 3**

Practice Principles to guide individuals engaging with current and former athletes through times of transition pertaining to the food-body relationship