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Disordered eating within elite male adolescent rugby: a cross-sectional study of the eating habits and attitudes in male academy rugby union players

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ABSTRACT

Background: Due to a range of pressures associated with high-performance environments, elite athletes are at increased risk of eating disorders and disordered eating. Most prevalence studies focus on female athletes in lean or esthetic sports, with males, particularly those competing in power sports, seldom considered. This study addresses this gap by exploring disordered eating in elite male adolescent rugby union players.

Methods: We distributed an online survey to male rugby players aged 16–18 through RFU-affiliated academies. The survey contained three sections: general demographics; the Eating Disorder Examination Questionnaire (EDE-Q); and knowledge of eating disorders.

Results: From 107 responses, 14% had a global EDE-Q score that met the clinical cut off of 1.68 for males displaying symptoms of an eating disorder. An increased Body Mass Index (BMI) was statistically significantly associated with a positive increase in global EDE-Q score. Props demonstrated the highest global EDE-Q scores. The desire to change body size was also statistically associated with increased global EDE-Q scores. Most participants admitted poor knowledge of eating disorders and where to access help to manage them by giving a score of 2 on a 1–5 Likert scale ranging from no knowledge to very knowledgeable.

Conclusions: Overall, 14% of the elite adolescent male rugby participants in this study met the clinical cut off EDE-Q global score, suggesting that there may be a higher prevalence of disordered eating behaviors and attitudes compared to the general population. Increased BMI and certain positions are associated with more disordered eating behaviors and attitudes. There is also a lack of confidence in knowledge about EDs and where to access help, therefore greater education and awareness about this issue is warranted. More research is required to further explore the reasons for the increase in disordered eating behaviors and attitudes.

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Rugby; adolescents; eating disorders; sport; elite athletes; mental health; nutrition

Introduction

The prevalence of eating disorders (ED) within sports has been well documented, especially in aesthetic, endurance, and weight-category sports [1]. These are often sports that are considered weight-sensitive, where weight is significantly impactful on performance [1]. Studies of team ball sports, such as soccer and field hockey, also support the fact that athletes are at a higher risk of developing EDs [2]. Additionally, further research has demonstrated that male team sports players may represent a group at even greater risk, particularly at a young age [3].

It has been shown that there is a high incidence of EDs within the general adolescent population [4,5] and within the adolescent elite athlete population more specifically [6]. However, there are limited studies that have investigated the prevalence of disordered eating and body image among rugby union players in particular. One study, undertaken in Argentina, collected data from 203 male rugby players aged between 18 and 36 [7]. This study showed that 9% of players demonstrated elevated eating pathology and highlighted a link between playing position and the rates of disordered eating habits. Playing position was considered an important factor in this research, due to the varying typical body shapes and physical demands of different positions. Rugby players who compete as forwards tend to have a larger BMI compared to backs, which may reflect a forward player's increased demand for high strength movements. A different study looked at elite professional men's rugby players in New Zealand [8]. It demonstrated elevated disordered eating habits including bingeing, purging, and food-type avoidance. The researchers also found that close to half of the players interviewed had been told explicitly that losing weight would improve their performance in this professional setting. Importantly, they noted a significant association with age and certain pathological eating habits, with younger athletes within this population being more likely to experience these habits. In a 12-month prospective cohort study, by Gouttebarge et al., which looked at symptoms of common mental disorders among professional rugby players, 11% of respondents reported symptoms of eating disorders [9].

Despite these findings, there have been no studies looking at the under-18 population, a population known to have an increased prevalence of ED, in rugby union [4,5]. Additionally, theoretical models such as the transdiagnostic cognitive-behavioral theory of eating disorders suggest that the overevaluation of eating, body shape and weight – which is often reinforced in sport environments – are central to both the development and maintenance of disordered eating [10]. In adolescent male athletes, these concerns may be further exacerbated by sport-specific pressures, such

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as those linked to achieving an 'ideal' body for one's position (e.g. increased muscularity for forwards, leanness for backs), internal performance expectations, and external pressures from coaches or peers [11,12]. Prior studies have noted that both BMI and body dissatisfaction are among factors that may act as both psychosocial and physiological stressors that contribute to disordered eating in young adults [13,14]. Therefore, variables such as body size, BMI, and playing position are not only descriptively relevant but may serve as potential risk factors when examined.

This study aims to: (1) determine the prevalence of disordered eating behaviors and attitudes in male academy rugby players aged 16–18 using validated instruments; (2) identify demographic and rugby-specific factors associated with disordered eating; and, (3) assess participants' knowledge of eating disorders and available support resources.

Method

Study design

We performed a cross-sectional study within the male academy rugby playing population within England. English Rugby Football Union (RFU) academies were contacted and asked to distribute a questionnaire to players aged 16–18. It was made clear that participation in this study was voluntary, and that players could withdraw from the study at any time. Ethical approval was granted by the University of Sheffield ethics committee (reference number: 058523). A minimum sample size of 100 participants was required. This was established using the method described by Charan et al. for calculating minimum sample sizes in cross-sectional quantitative designs [15] and using data regarding the prevalence of ED in adolescent elite athletes, as found in research by Martinsen et al. [16].

Questionnaire development

The questionnaire was formulated with input from two senior clinicians with experience and expertise in ED (JM, PH) and included three components. Demographic and rugby-specific information was collected in the first component. This includes academy, age, height and weight, rugby position, self-reported size compared to peers, and desire to change size. The next component is the Eating Disorder Examination Questionnaire (EDE-Q), a validated tool in this population for identifying potential symptoms of ED. This questionnaire is formed of four scores providing a global EDE-Q score. These four subscales are restraint, eating concern, shape concern, and weight concern. The EDE-Q measures various attitudes and behaviors that have been demonstrated within the last 28 days. Higher scores demonstrate higher pathological behaviors and attitudes associated with ED. For this study, we used a clinical cut off of an EDE-Q global score of over 1.68 to demonstrate individuals with clinically significant disordered eating behaviors and attitudes. The EDE-Q global score of 1.68 has been validated as the optimum clinical cut off score for males from a previous study of 450 men, with a sensitivity of 0.77 and specificity of 0.77 [17]. This represents a lower clinical cut off than is generally used, as the usual clinical norms are shaped around responses from women. Our use of this lower cut off is also further supported by significant differences that have been established between the normative data in adolescent boys and girls EDE-Q [18]. Finally, the third section asked players whether they believed their eating habits to be of concern to themselves as well as their knowledge of ED and where to access help for ED.

The online questionnaire was developed using Google Forms and underwent two rounds of testing with a small pilot of individuals who were not participating in the study to ensure technical functionality, usability, and clarity prior to distribution.

Distribution and survey completion

The questionnaire was distributed as a web-based form to eligible players via direct e-mail to players from coaches based at the academies that had agreed to participate. Participation by individual players was entirely voluntary and this was made clear at the time of questionnaire distribution. The survey included a completeness check prior to submission. Participants were able to review and change their answers before final submission using a back button. Academies received a follow-up reminder after 2 months, to encourage them to reshare the questionnaire with players. The questionnaire remained open for 4 months during the 2024/2025 mid-season.

Statistical analysis

Data collected from the questionnaire was imported into SPSS for statistical analysis. Responses to the questionnaire that included verbal descriptors were assessed for clarity. Terms that explicitly denoted a quantifiable frequency (e.g. none, all) were retained, whereas responses containing ambiguous or nonspecific terms (e.g. some) were excluded from the dataset and removed from subsequent analysis. In these cases, the full EDE-Q responses were removed from analysis; however, the responses regarding knowledge of eating disorders and where to access help were still included. Initial analysis comprised descriptive statistics including means (with standard deviation), medians (with inter-quartile range (IQR)), and percentage of the study population. Body Mass Index (BMI) was calculated from self-reported height and weight. Normality of data was assessed using the Kolmogorov–Smirnov test. Independent T tests were used to calculate the significance of the difference between demographic groups for the normally distributed data. When there were three or more categories, the use of ANOVA was implemented. Where non-parametric data with small sample sizes in each subgroup was analyzed, such as when comparing EDE-Q scores for positions, the Mann-Whitney U test or the Kruskal Wallis test was used depending on the number of sub-groups. A simple linear regression model was used to interpret the relationship between two continuous variables. A significance level of <0.05 was used for all calculations.

Results

Study population and demographics

The questionnaire was accessible from November 2024 until March 2025. There were 107 responses, of which, four were removed prior to statistical analysis due to being incomplete. Of the 103 responses that were analyzed, 57% were from 16-year-olds, 30% from 17-year-olds and 13% from 18-year-olds. Overall, 59% of the respondents played in the forward rugby positions, and 41% of respondents played in the back rugby positions. Across individual rugby positions, responses from back row players (a type of forward player) were most common.

The mean BMI of respondents was 26.9 with a range of 20.8 to 39.0. The most common response when participants were asked about a desire to change weight was that they wished to be 'slightly larger' with 68% of respondents expressing this. Overall, 14% of respondents wanted to be 'much larger,' 11% wanted to remain the 'same size,' 7% wanted to be slightly smaller and only 1% wanted to be much smaller. Both clubs had nutritionists available to academy players, with 76% of respondents being aware of this. The remaining 24% were either unsure or believed they did not have access. The most common response to the questions about knowledge of eating disorders and knowledge of where to access help on a 1 to 5 Likert scale was 2, where 1 is no knowledge and 5 is very knowledgeable.

ED symptoms across the population

The mean scores for the EDE-Q were as follows: Global = 0.83 (SD = 0.76), Restraint = 1.06 (SD = 1.07), Eating = 0.41 (SD = 0.77), Shape = 0.94 (SD = 0.99), Weight = 0.91 (SD = 1.03). We observed that 11% of respondents had at least one episode of losing control and overeating in the last 28 days, with 15% having a fear of losing control and overeating, to varying degrees. It was found that 37% respondents felt a feeling of guilt when eating with 9% eating in secret at least once in the last 28 days. Across our study population, 39% of respondents reported that they have exercised in a 'driven' or 'compulsive' way as a means of controlling their weight or shape. There were no reports of respondents making themself vomit or using laxatives as a means of controlling their weight. We observed that 14% respondents met the clinical cut off with an EDE-Q score of greater than 1.68. Within the clinical cut off group, the means with SD were as follows: Global = 2.33(0.66), Restraint = 2.20(0.88), Eating = 1.57(1.45), Shape = 2.75(0.92), Weight = 2.79 (1.00). The characteristics of the participants that met the clinical cut off are available in Table 1.

Demographic influences

BMI was statistically significantly associated with global EDE-Q scores (Figure 1). The standardized regression coefficient was 0.23, indicating a small to moderate positive effect which was statistically significant ($p = 0.02$). The linear regression model explained 5.3% of the variation in EDE-Q global scores (R^2 = 0.053) based on the sample size.

Position

The EDE-Q global scores for the forwards and backs displayed normal distribution. Comparison of EDE-Q global scores between forwards and backs using an independent samples t test revealed no statistically significant difference ($p = 0.69$). The mean score for forwards ($M = 0.85$, SD = 0.68) was slightly higher than for backs ($M = 0.79$, SD = 0.87), with a mean difference of

Table 1. Characteristics and EDE-Q scores of respondents who met the clinical cut off (EDE-Q global > 1.68).

Primary Rugby Union Playing Position	BMI calculated	How do you perceive your size relative to other players in your position and at your age?	If you were able to change your size, such as your weight or muscle mass, how would you want it to change?	EDE-Q total score	Restrictive eating and dieting	concern with eating	concern about bodyshape	concern about weight	Do you believe your eating habits to be of concern?
Hooker	27.47	Slightly larger	Slightly larger	1.71	3.6	0.6	2.25	0.4	No
Back-Row	27.81	Slightly smaller	Slightly larger	1.76	0.6	0.6	2.63	3.2	I don't really think about it
Fly Half	25.88	Same size	Same size	1.81	2.2	1.2	2.25	1.6	No
Full Back	20.83	Same size	Slightly larger	1.9	1.6	1.2	2	2.8	No
Winger	22.13	Much smaller	Much larger	1.93	1.2	0	3.13	3.4	I don't really think about it
Full Back	23.04	Same size	Slightly larger	1.94	3.4	0.6	1.75	2	No
Prop	32.93	Slightly larger	Slightly larger	2.02	2	2	1.88	2.2	I don't really think about it
Prop	32.24	Same size	Slightly larger	2.24	3	1.8	1.75	2.4	I don't really think about it
Hooker	30.13	Slightly larger	Slightly smaller	2.28	2.4	0.2	3.5	3	No
Prop	33.91	Slightly larger	Slightly smaller	2.33	1.8	1.4	2.13	4	No
Prop	28.91	Slightly larger	Slightly smaller	2.63	2.2	2.2	3.13	3	No
Prop	35.17	Slightly larger	Much smaller	2.79	3	1.6	3.38	3.2	Yes
Center	26.30	Much larger	Much larger	3.11	1.2	2.6	4.63	4	Yes
Center	24.10	Slightly smaller	Slightly larger	4.13	2.6	6	4.13	3.8	No
Mean Average	27.92			2.33	2.2	1.57	2.75	2.79	
Standard Deviation	4.53			0.66	0.88	1.49	0.92	1.00	

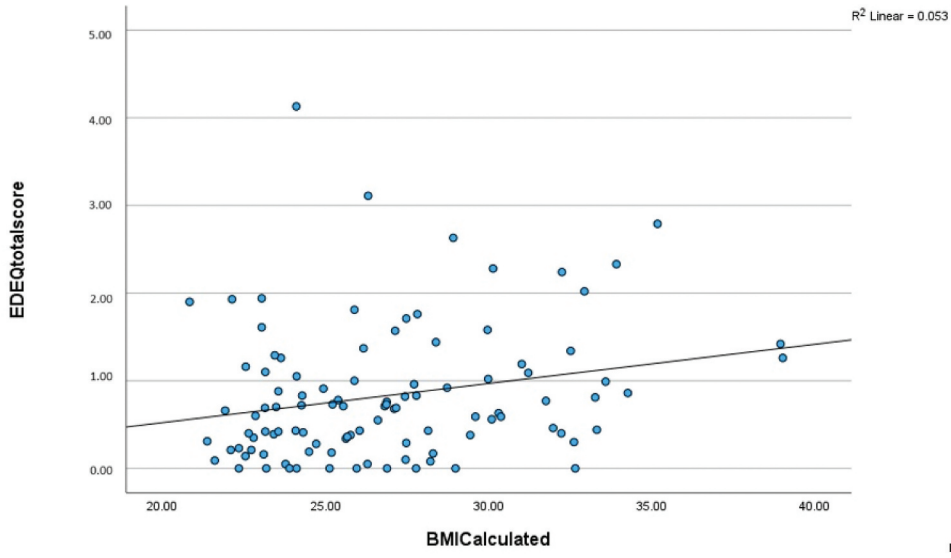

Figure 1. BMI correlation with global EDE-Q score.

0.061 (95% CI: −0.24, 0.36), but this difference was not statistically significant. The data for individual positions was not normally distributed, with some small sample sizes in sub-groups. A Kruskal–Wallis H test was conducted to compare EDE-Q global score between the positions (Figure 2). There was a statistically significant difference between the groups, H(8) = 18.051, p = 0.021. Post-hoc analyses were conducted to determine which groups differed significantly. The only statistically significant pairwise comparison was between players in the back row and prop positions (p = <0.001).

Desire to change size

As desire to change size displayed nonparametric data, a Kruskal–Wallis H test was conducted to compare EDE-Q global score between the different categories (Figure 3). There was a significant difference between the groups, H(4) = 11.842, p = 0.019. Post-hoc analyses were conducted to determine which groups differed significantly. The only statistically significant pairwise comparison was between players that wanted to be slightly larger compared to slightly smaller (p = 0.003).

Age group and variance in clubs

All three age groups (under 16/17/18) and the club-specific data for global EDE-Q scores displayed nonparametric data. Independent samples Kruskal–Wallis tests were performed for both groups. p values of over 0.05 were observed for both and

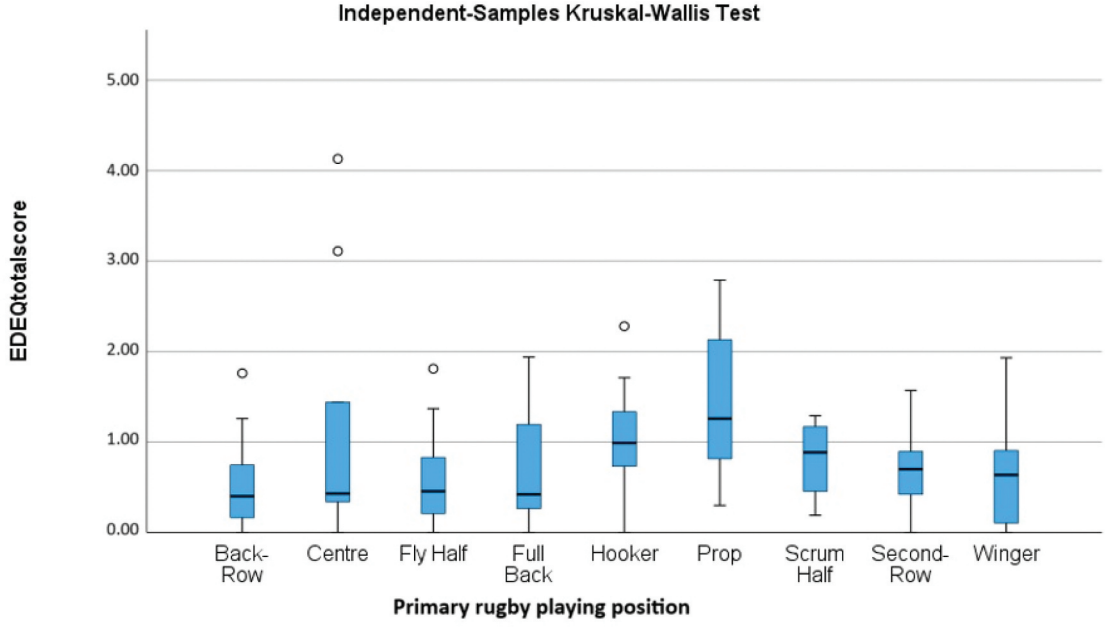

Figure 2. Kruskal Wallis test for EDE-Q and Primary rugby position.

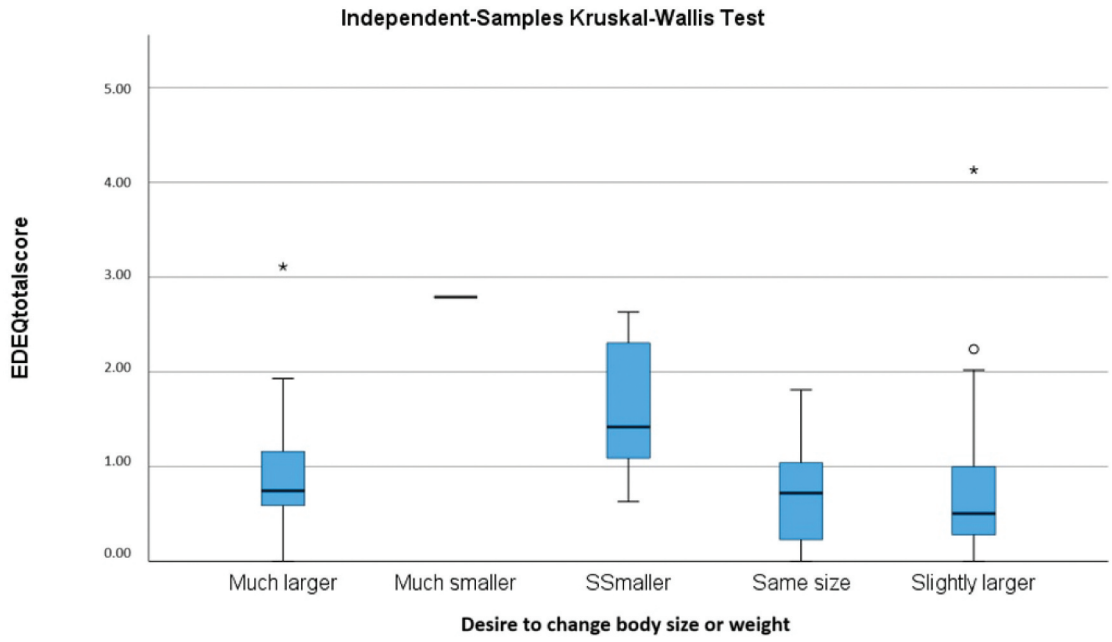

Figure 3. Kruskal–Wallis test for desire to change size and global EDE-Q score ('SSmaller'- slightly smaller).

therefore it was established that there was no statistically significant difference between their global EDE-Q scores.

Discussion

Key findings

Overall, 14% of elite male adolescent rugby players in this study demonstrated disordered eating attitudes and behaviors that meet clinical thresholds. A higher BMI and a greater desire to change body size were significantly associated with increased disordered eating attitudes and behaviors. When players in forward positions were compared to player in back positions, there was no statistically significant difference in global EDE-Q score, however Props had the highest mean scores.

Interpretation of study results

We found that players in forward positions did not have a statistically significant higher prevalence in global EDE-Q score compared to players in back positions. However, props demonstrated the highest global EDE-Q scores when compared to the other positions. The difference was only statistically significant when props were compared to back-row forwards and therefore limiting our ability to confirm this playing position as a risk factor. While these findings are based on small samples, they could be accounted for by the significant association we found between BMI and global EDE-Q score. Props and hookers (both forward positions) have the highest BMI compared to other positions in rugby [19]. This is due to the requirements of players in different positions in rugby. A key aspect of the front row is scrummaging, therefore having an increased body mass provides a competitive advantage. This variance in BMI depending on position, and the requirements of the position, has been reported in other sports as well such as soccer [20,21]. The observed greater BMI of players in these positions may explain the higher prevalence of disordered eating behaviors and attitudes in this population.

We also found that a desire to change size was significantly associated with differences in global EDE-Q score. This could be due to the use of unhealthy practices to change body size. We did not identify a significant difference in global EDE-Q scores between players wanting to lose weight and those wanting to gain weight, suggesting that players may employ maladaptive behaviors for both weight gain and weight loss. Other studies have also demonstrated a similar association and may help to explain why this was observed in our population. Boyd et al. found that there was a relationship between desired weight and eating disorder pathology in youth populations [22]. Work by Fan et al. found that there was an association with dieting practices and eating disorder attitudes and behaviors [23]. Ganson et al. reported that participating in 'bulking and cutting,' a method to put on muscle in cycles, was significantly associated with eating disorders [24].

These pathological behaviors and attitudes starting at a young age, and in the early stages of a player's development, may have implications as they progress into different stages of their career. As adolescents mature into young adults, their eating attitudes and behaviors often deteriorate; consequently, players exhibiting symptoms now may experience a worsening of these issues with age [25]. It is also understood that peer and family influence has a significant effect on disordered eating behaviors and attitudes, and the pressure to both perform in rugby and progress in a professional rugby career may further exacerbate them [26].

The evidence from this population, alongside other published research, should help inform interventions that can support at-risk players. A framework to achieve this is

described by Currie in three steps [27]: identify and prevent environments that contribute to development of eating disorders; identify players at risk; and treat players with disordered eating behaviors and attitudes. However, there is still a need for more resources to support the education of coaches and staff about disordered eating within the sports setting, as well as sport-specific advice for rugby [28].

Comparisons to previous studies

From the NHS England Mental Health of Children and Young People Survey of 2023, data showed that 5.1% of boys aged 17–19 (the most similar age group to our population) met the criteria for an eating disorder [29]. In our study, we demonstrate that 14% of respondents met the clinical cut off EDE-Q score for males, and although we are not able to formally diagnose respondents with EDs based on this score, this may suggest a higher prevalence of disordered eating in our population compared to the general population. Furthermore, the prevalence of players showing disordered eating habits and behaviors in this study was slightly higher than the reported 8.9% in Compte et al.*'s* research within adult Argentinian players [7]. This could be due to the fact that younger people often demonstrate signs of EDs more frequently [30,31], or that Compte et al.'s study used a higher global EDE-Q score clinical cut off which was only validated using a sample of female respondents. Although Gibson et al. used different measures of disordered eating behaviors and attitudes, their conclusion – that respondents 'experience disturbances in body image' - is consistent with our own findings. This study adds weight to their conclusions that more work is needed to quantify the scale of disordered eating behaviors and attitudes within rugby, as well as work to identify the reasons behind it. The use of sport-specific mental health questionnaires, such as the Sport Mental Health Assessment Tool 1 (SMHAT-1), can also provide a snapshot about eating behaviors and attitudes in athletes. The disordered eating section within it utilizes the Brief Eating Disorder in Athletes Questionnaire (BEDA-Q), which asks nine short questions related to eating and body image. This questionnaire was completed by 220 Japanese rugby players and focussed on the general sport-related psychological distress experienced by these elite rugby athletes [32]. Over 36% of respondents reported experiencing disordered eating symptoms. This figure includes all players that reported any symptom and does not relate to a clinical cut off, which could account for the perceived high prevalence. However, this still supports the conclusion that there could be an increased rate of disordered eating in the rugby population. Our data also suggests that our respondents lacked knowledge about EDs and the information about where to access help to manage them. This further aligns with the findings of other studies demonstrating that more work is needed to educate players about this [7,8].

Strengths and weaknesses

The EDE-Q was an appropriate tool for this study, given its validated use within the target population of adolescent males [18,33]. This demographic was chosen due to its underrepresentation in disordered eating research and to determine if findings align with the limited literature on adult male rugby players [7,8,34]. We also collected data on specific positions owing to the variety of body shapes and sizes across players within rugby. This design allowed for identification of potential risk factors including BMI, playing position, and body size dissatisfaction.

A limitation of this study relates to the use of a self-reported measure which may have led to response bias [35]. A negative stigma that surrounds mental health symptom reporting exists at high rates within the adolescent athlete population [36], with male athletes potentially suffering more from this due to the 'masculinity' of sport [37]. This may have led to the under reporting of symptoms, or downplaying the severity of them in our study. However, we have attempted to mitigate this through the anonymous format of data collection. Even though we collected a large amount of valuable data with insights into the eating behaviors and attitudes of young rugby players, the use of a cross-sectional design has not allowed us to examine a causal effect, limiting the power of this study to address any concerns arising. Participants from only two academies may limit generalizability to the broader rugby academy population. Finally, there was a risk of selection bias: as eating disorders are a sensitive topic, those with eating concerns may have been more or less likely to participate.

Future research directions

More evidence is required from this population, necessitating a broader reach to players across various clubs to evaluate consistency. Further to this, there are additional populations that need to be assessed. There is a higher prevalence of eating disorders within female populations, with those aged 15–19 being considered particularly high-risk [38]. It would also be important to assess the risk faced by community rugby players, which could indicate a need for a grassroots education program.

From a dietary viewpoint, there may be a need to consider whether disordered eating behaviors may contribute to a dietary intake that does not meet nutritional recommendations. This is especially relevant in adolescent elite rugby players, where high energy and nutrient demands may not be adequately met if unhealthy or restrictive eating behaviors are present. Studies suggest that athletes, including rugby players, may already be at risk of suboptimal dietary intake, particularly for micronutrients and overall energy availability [39]. Current evidence suggests that adolescent rugby players adequately fuel themselves, and their energy intake is proportionate to their performance goals [40]. However, if these performance goals are influenced by disordered eating habits and negative feelings surrounding body image, then the energy intake may not reach the high demands of participating in elite rugby. Furthermore, given our findings of increased disordered eating in front-row players, it would be relevant to explore whether dietary intake patterns vary by playing position, as research comparing backs and forwards in other contexts suggests such differences may exist [41]. Including this context may

improve the interpretation of our findings and help inform targeted nutritional interventions.

Longitudinal studies following players through different points of the career, as well as into retirement, would also provide insight into other factors that may increase the prevalence of symptoms. To address this issue, further research – particularly qualitative studies – is likely to be needed to identify specific causes and risk factors that contribute to disordered eating behaviors and attitudes among rugby players. Methods such as semi-structured interviews would offer detailed insights into the individual players' lived experiences, including their perceptions of body image, performance pressures, and food-related behaviors. Ethnographic approaches – such as immersive observation within team environments – could further illuminate the cultural norms, coaching practices, peer dynamics, as well as the institutional expectations that potentially encourage or normalize disordered eating. These methods would be especially valuable for uncovering the often unspoken contextual and cultural influences that are difficult to capture and highlight through quantitative approaches alone.

Clinical implications

The findings from this study suggest that there could be a higher prevalence of disordered eating attitudes and habits within the elite adolescent male rugby population. Clinicians and non-clinicians working in this setting should have an increased awareness about eating disorders for this population, and work should be undertaken to promote an environment that is not conducive to the development of disordered eating behaviors. The now-established lack of confidence in the knowledge of eating disorders, and where to access help for them, can help to justify the development of educational interventions for use in this population.

Conclusion

Overall, 14% of the elite adolescent male rugby participants in this study met the clinical cut off EDE-Q global score. Whilst the EDE-Q is used a screening tool and is therefore not diagnostic without further clinical assessment, this finding suggests that there may be a higher prevalence of disordered eating behaviors and attitudes compared to the general population. Increased BMI and certain positions are associated with more disordered eating behaviors and attitudes, indicating a potential need for position-specific considerations. Within this adolescent rugby population, there is also a lack of confidence in knowledge about EDs and where to access help, therefore greater education and awareness about this issue is required. Additionally, further research is warranted to quantify and explain the reasons for the increase in disordered eating behaviors and attitudes. This further research could then also be used to address the causes and environments that contribute to the development of disordered eating attitudes and behaviors.

Ethics

This project has received University of Sheffield Ethics Committee approval, number 058523.

Consent for publication

'The data may also be used to generate presentations at academic conferences and publications in journals.' From the participant consent form.

Availability of data and materials

Withheld to protect the anonymity of respondents

Disclosure statement

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Author's contributions

Conception of study: JD, JM, PH, AP. Design of study: JD, DH, PH, SB. Ethics approval: SB, DH. Interpretation of results: JD, JM. Write up: JD, JM, DH, SB. Approval of paper: JD, JM, SB, DH, AP, PH.

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