

Do healthy athletes have higher scores in the Eating Disorder-Questionnaire? A pilot study

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Summary

The prevalence of eating disorders is increased in athletes. Nevertheless, it is unclear whether the Eating Disorder Examination-Questionnaire (EDE-Q) can be used as a screening tool in sport. There is no difference in the EDE-Q between athletes without eating disorders (N = 29) and non-athletes (N = 15). Thus, healthy athletes do not exhibit a false high EDE-Q score.

Keywords: Screening, athletes, eating disorders, EDE-Q

Background

The prevalence of eating disorders in athletes has been estimated as 18–55 % [1, 2]. Diagnosis may be more

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difficult in competitive athletes, as the symptoms are variable and the eating disorders may be atypical. Diagnostic criteria such as underweight (body mass index [BMI] \leq 18.5 kg/m²) or menstrual dysfunction may be missing, but can also occur in athletes without eating disorders [3]. For this reason, athletes require a standardised procedure that allows early detection and treatment of individuals at risk [4]. The International Olympic Committee (IOC) has recommended appropriate screening as part of the annual health examination [5].

Standardised questionnaires are a helpful instrument for the screening and diagnosis of eating disorders. However, few questionnaires have been specifically developed for athletes; hence it is doubtful whether they can be applied to athletes [6, 7].

The Eating Disorder Examination Questionnaire (EDE-Q) (♦ Box 1) is a questionnaire that is applied in competitive sport [5, 8]. The validity of the EDE-Q has been convincingly demonstrated for men and women in the general population [9–11]. The EDE-Q includes questions about physical activity, body weight and nutrition. Athletes participate in more sport than the general population and body weight and nutrition often influence their performance. Thus, it is unclear whether competi-

tive athletes attain a higher EDE-Q score than non-athletes.

The objective of the present pilot study was to assess whether the EDE-Q score of athletes without eating disorders differs from that of control persons without eating disorders.

Methods

Study participants

This case series examined the 29 competitive athletes – 13 female and 16 male – from the following German national teams: canoeing (N =

Glossary

Alopecia: Hair loss, may occur as a sign of Anorexia nervosa or Bulimia nervosa.

Lanugo: Downy hair that normally occurs in fetuses in the second half of a pregnancy. Lanugo is also observed in patients with eating disorders, particularly Anorexia nervosa.

Russell signs: In bulimic patients, self-induced vomiting can lead to skin changes (hyperkeratotic lesions) on the back of the hand, particularly over the metacarpophalangeal joint of the dominant hand.

7), cycling (N = 6), rowing (N = 5), triathlon (N = 5), boxing (N = 3), shooting (N = 2) and swimming (N = 1). Most participants underwent two training units per day. The control group consisted of 15 moderately active persons (7 female and 8 male) who undertook a maximum of 3 h sport per week. The competitive athletes were recruited during the annual sports medical health examination at the Olympic site in Brandenburg.

The inclusion criteria for all volunteers were age between 18 and 35 years, BMI of 18.5–30 kg/m² and the reliable exclusion of an eating disorder by a doctor. The participants were informed of the contents of the study and gave their written consent to participation.

Study protocol

The volunteers completed the EDE-Q independently. The volunteer's medical history was then discussed, including medical issues, sporting activity and changes in body weight. A record form – developed in a pilot study – was used to record any physical symptoms related to eating disorders. These included chronic exhaustion, cold intolerance, musculoskeletal and gastrointestinal symptoms and delayed wound healing [12]. The physical examination included the exclusion of alopecia, parotis enlargement, RUSSELL signs (hyperkeratotic lesions over the metacarpophalangeal joints, particularly of the dominant hand) and lanugo hair coat. The haemogram was determined to test for concomitant anaemia [12].

Data analysis

Total and subscale scores were first calculated on the individual level [8]. A score of ≥ 4.0 was defined as the cut-off value for a clinically relevant eating disorder [13]. In addition, items (questions 13–18), were

On the basis of 23 items, the EDE-Q records specific eating disorder pathology in four subscales:

- Restraint Scale, 5 items
- Eating Concern Scale, 5 items
- Weight Concern Scale, 5 items
- Shape Concern Scale, 8 Items

Another six questions were excluded from the evaluation of the overall EDE-Q score and the subscale scores, but provide information on control behaviour, compulsion and loss of control.

The German version of the EDE-Q is freely available under: www.vfp-muenster.de/publikationen/online/EDE-Q_VfP_2.pdf.

German reference values (normal ranges) have been published, e. g. in:

- Hilbert A, Brähler E, de Zwaan M (2012) Eating disturbances in the German population. *Psychother Psychosom Med Psychol* 62(3-4): 139–141
- Hilbert A, de Zwaan M, Braehler E (2012) How frequent are eating disturbances in the population? Norms of the eating disorder examination questionnaire. *PLoS One* 7(1): e29a125

Box 1: The Eating Disorder Examination-Questionnaire (EDE-Q)

analysed that are not included in the calculation of the score. The data were analysed descriptively (mean \pm standard deviation; M \pm SD) and inferentially (t-test for independent samples, with $\alpha = 0.05$).

Results

There were no differences between the athletes and the control group with respect to height and weight. Nevertheless, the athletes' BMI and body fat percentage were signifi-

cantly lower (\blacklozenge Table 1). On the basis of the above criteria, it was concluded that none of the volunteers were suffering from an eating disorder. The clinical chemistry parameters were within the normal range; this applied to both the group means and the individual values.

The EDE-Q (Box 1) did not identify an increased risk of eating disorders in any of the study participants. The EDE-Q score came to 0.75 ± 0.65

	Athletes (N = 29, 13f/16m) M \pm SD	Control group (N = 15, 7f/8m) M \pm SD	p value
Age (years)	21.7 \pm 3.3	26.9 \pm 2.3	< 0.001
Height (cm)	177.6 \pm 9.3	173.0 \pm 8.3	0.103
Weight (kg)	70.6 \pm 10.1	77.4 \pm 13.6	0.066
BMI (kg/m ²)	22.2 \pm 2.0	25.7 \pm 3.1	< 0.001
Body fat percentage (%)	14.4 \pm 5.1	21.6 \pm 6.1	< 0.001

Tab. 1: Anthropometric parameters of the volunteers

BMI = body mass index; f = female; m = male; M = mean; SD = standard deviation

points in the group of athletes and 0.78 ± 0.54 points in the moderately active control group ($p = 0.881$; ♦ Table 2). There were no differences between the athletes and the control group with respect to any of the EDE-Q subscales. With the exception of the “Shape Concern” scale, the effect sizes were all small. The cut-off value of 4.0 was not exceeded. For the athletes, the ranges were as follows: overall score 0.0–2.4; restraint 0.0–3.8; eating concern 0.0–1.6; weight concern 0.0–3.4; shape concern 0.0–2.8. For the moderately active control group, the ranges were as follows: overall score 0.1–2.1; restraint 0.0–2.2; eating concern 0.0–0.6; weight concern 0.2–2.8; shape concern 0.1–3.3.

There were significant differences between the athletes and the control group in some of the items not used in the calculation of the score. Athletes more frequently reported that they had consumed unusually large quantities of food within the previous 28 days (on 9.9 ± 13.1 days) than the control group (on 1.5 ± 0.4 days; $p = 0.001$). Moreover, more athletes reported that they had “compulsively” carried out sport, in order to control their weight, shape or percentage body fat (on 13.4 ± 24.3 days within the last 28 days, vs. 0 ± 0 days, $p = 0.006$). Eleven (11) of 29 athletes (38 %) reported

that they had compulsively trained at least once, with the aim of regulating their body weight.

Other items – including loss of control of eating behaviour, consumption of unusually large quantities of food in combination with loss of control, ingestion of laxatives to control weight – were answered in the negative by all volunteers – corresponding to no event within the previous 28 days.

Discussion

In the subscale and overall scores of EDE-Q, there were no significant differences between healthy competitive athletes and healthy persons of moderate physical activity. Most of the effects were small. It is important to note that the overall and subscale scores in both groups were below the values described in the literature as critical [9, 10]. In a cohort of 404 normal to overweight male students, LAVENDER et al. found scores that were clearly greater than those found in the present study: overall score 1.09 ± 1.00 ; restraint 1.04 ± 1.19 ; eating concern 0.43 ± 0.77 ; weight concern 1.29 ± 1.27 ; shape concern 1.59 ± 1.38 [9].

In a group of 723 female students, LUCE et al. recorded an EDE-Q score of 1.74 ± 1.30 , with subscale values

of 1.62 ± 1.54 (restraint), 1.11 ± 1.11 (eating concern), 1.97 ± 1.56 (weight concern) and 2.27 ± 1.54 (shape concern) [10].

The reason that the EDE-Q values in the present study were relatively low may be that patients with eating disorders were deliberately excluded, as the study was intended to examine whether competitive sport per se leads to higher values in the EDE-Q in healthy volunteers. In contrast, LUCE and LAVENDER used the EDE-Q as a screening instrument for eating disorders in colleges, so that volunteers with eating disorders – or at increased risk of eating disorders – were also recorded.

In the present study, no volunteer was excluded from the study due to a positive medical history or clinical abnormalities. There was nevertheless a high proportion (38 %) of athletes who had “compulsively” undertaken physical training at least once during the previous 28 days, with the aim of controlling their body weight, shape or percentage body fat. This finding must be regarded critically. Athletes should be advised to accept professional support in the form of a nutritional plan adapted to their training, if they are to achieve their individual objectives of optimising body weight and body composition.

	Athletes M ± SD	Control group M ± SD	p value	t value	Effect size*
Restraint	0.98 ± 0.98	0.55 ± 0.56	0.126	-1.563	0.43
Eating Concern	0.31 ± 0.44	0.17 ± 0.20	0.259	-1.144	0.31
Weight Concern	0.82 ± 0.99	1.03 ± 0.77	0.487	0.701	0.21
Shape Concern	0.88 ± 0.89	1.36 ± 0.97	0.107	1.645	0.54
Overall Score	0.75 ± 0.65	0.78 ± 0.54	0.881	0.151	0.05

Tab. 2: Results of the Eating Disorder Examination-Questionnaire (EDE-Q) for athletes and the moderately active control group

*Effect size, $(\bar{x}_s - \bar{x}_c) / SD_c$ where \bar{x}_s is the mean of the athletes group, \bar{x}_c the mean of the control group and SD_c the standard deviation of the control group
M = mean; SD = standard deviation

Study limitations

The limitations of this study include the low number of participants, the limited range of sports and the high proportion of male volunteers, who are at a lower risk of eating disorders in the general population. In addition, the use of the EDE-Q has not been validated for competitive athletes from high risk sports, such as aesthetic and weight class sports.

Conclusions

The results of this study indicate that falsely raised EDE-Q values or the mistaken diagnosis of an eating disorder are unlikely for healthy competitive athletes in the sports investigated. Nevertheless, no conclusion can be drawn about the sensitivity of the EDE-Q when used in competitive sport. It follows that the risk of a false positive diagnosis of an eating disorder is low when the EDE-Q is used. More studies are needed on the sensitivity of the EDE-Q in competitive athletes in different sports, so that this instrument can be used to screen for eating disorders during health tests on competitive athletes.

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Interessenkonflikt Conflict of Interest

The authors declare no conflict of interest according to the guidelines of the International Committee of Medical Journal Editors.

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