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Body image concerns, dieting behavior, and eating disorder risk of Kenyan adolescent female athletes

Esther Nduku Muia

ABSTRACT

Aim: The purpose of this study was to investigate body image concerns, dieting behaviors, and eating disorder risk among adolescent female athletes (n=61) and non-athletes (n=49) in Kenya.

Methods: Eating disorder risk was assessed using the Eating Disorder Inventory version 3 (EDI-3), the EDI-3 referral form assessed pathogenic weight control measures (PWCM), and a figure rating scale (FRS) assessed body image concerns.

Results: Athletes and non-athletes had similar raw scores across all EDI-3 subscales. More athletes than non-athletes had a body mass index (BMI) < 17.5 kg/m² (16.1 vs. 0%, OR = 0.8, 95% CI 0.7–0.9, p=0.004) of which only half of these athletes (n=5, 8.2%) perceived themselves to be underweight. A sub-sample of athletes (16.4%) and non-athletes (26.5%) perceived themselves to be overweight while only 1.8% athletes and 11.1% non-athletes were classified as overweight according to body mass index cut-offs. Most (80.9%) participants desired a leaner body image, with 56% desiring a body image equivalent to a BMI < 17.5 kg/m². Top foods restricted when trying to lose weight included dietary fats, carbohydrate rich foods, and dairy foods. Both groups reported to use PWCM; however, more athletes than non-athletes used PWCM (52.5% vs. 32.6%, p=0.031).

Conclusion: Kenyan adolescent athletes and non-athletes presented with body image dissatisfaction, extreme dieting behavior, and at risk of an eating disorder. These findings highlight the need for a healthy eating and body image intervention program among this cohort of Kenyan adolescents and their entourage.

Keywords: Body image, Disordered eating behavior, Eating disorder, Weight control

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INTRODUCTION

Disordered eating behavior (DEB) encompasses unhealthy eating habits that may include restrictive dieting, skipping meals or binge eating behavior [1]. It can progress to a clinical eating disorder (ED) [2]. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V) clinical eating disorders (EDs) are serious mental health conditions characterized by persistent disturbance in eating behaviors, body image, and related thoughts and emotions. The most common include anorexia nervosa, bulimia nervosa, and binge-eating disorder. The prevalence of DEBs and EDs are high among individuals from a western, modern, industrial society [3] and as such are traditionally considered to be culture-bound syndromes of the West where being thin symbolizes social acceptance, beauty, and success. In contrast, non-western populations, such as black Africans, idealize plumpness which symbolizes beauty, fertility, and good health [4, 5]. Evidence are emerging that DEBs and attitudes as well as EDs are increasing among non-western populations relating to rapid sociocultural and economic change, which is seen

with westernization and urbanization [4]. Emerging evidence indicates that DEBs and EDs are both rising in Kenya. For instance, a large sample of university and high school students reported a 3.2% prevalence of clinical binge-eating disorder and 19% of binge eating related behaviors alongside depression, anxiety, and substance abuse [6]. Similarly, undergraduates in a Kenyan University exhibited body image dissatisfaction similar to those observed in western populations [7]. Additionally, a national health news report (April, 2024) reported that over 15% of Nairobi youth engaged in extreme weight control behaviors driven by concerns about appearance especially in areas where social media adoption was high [8]. All these indicate shifts from the traditional norms that valued plumpness for fertility and health.

A higher prevalence of disordered eating and eating disorders are reported among females and males in athletic populations compared to non-athletic populations [9–11]. Athletes most at risk of disordered eating behavior and eating disorders are those competing in sport which emphasizes body shape or where leanness is a requirement of the sport [12, 13]. There is paucity in the literature on the prevalence and risk factors of disordered eating behavior and eating disorders in athletes from non-western countries and amongst minority groups. Evidences are mixed on the prevalence of disordered eating and eating disorders among athletes from non-western countries. Okano and colleagues [14] found a lower prevalence of disordered eating among Chinese collegiate female runners (4%), rhythmic gymnasts (2%), and gymnasts (0%) than among Japanese athletes (21%, 19%, and 15% respectively), partly contributing the difference to sociocultural and socioeconomic drives to thinness. Additionally, a recent study on Nigerian female athletes indicated that 22% exhibited DEB driven by internalization of western beauty ideals [15] while Ethiopian long-distance runners indicated a 15% prevalence of clinical disorders, with higher rates reported among urban athletes compared to their rural counterparts [16].

Similarly, a lower probability for an eating disorder was shown in adult female Kenyan distance runners (4.4%) compared to UK runners (19.5%) [17]. Contrary to these, 69% of vocational female student dancers from South Africa were identified with disordered eating behavior partly linked to sociocultural pressure to attain a lean physique [18]. Ethnicity and acculturation within ethnic groups as risk factors for disordered eating and eating disorders are complex and dependent of the cultural context and outcome of interest [19, 20], found a higher percentage of Caucasian athletes (65.2%) presented with disordered eating than African American athletes (31.1%). Disordered eating behavior (20%) was also identified in a group of Brazilian adolescent female aesthetic athletes [21]. These studies demonstrate that DEB and eating disorders are not just a western phenomenon but are being experienced worldwide, with transnational media and sport-specific demands being the main contributors.

More research is needed to explore the prevalence of disordered eating behavior and eating disorders among athletes from non-western countries and minority groups to provide insight into cultural and ethnic specific risks. This study therefore aims to explore the body image concerns, dieting behavior, and eating disorder psychopathology of adolescent female Kenyan middle and long-distance athletes and non-athletes.

Participants and study design

The study sample is described in detail elsewhere [22]. Shortly, volunteer middle and long-distance (≥1,500 m) adolescent athletes (n=61) and non-athletes (n=49) were recruited from six state owned secondary schools (4 boarding and 2 day schools) in Iten, Rift valley Province, Kenya (Table 1). Athletes competed at regional or higher level in the previous year or were scheduled to compete in the current year and non-athletes were not involved in any organized sport. Ethics approval was obtained from the Kenyatta University's Ethical Research Committee and the District Education Officer. Consent was obtained from school principals and participants. The school principals acted as legal guardians of participants.

Eating disorder psychopathology

Eating disorder psychopathology was assessed using the Eating Disorder Inventory version 3 (EDI-3) which is a self-reported measure to assess attitudes, emotions, and behaviors typically associated with disordered eating. It has been verified as an appropriate screening instrument for eating disorders in a nonclinical setting [23]. The EDI-3 consists of 91 items in Likert-type with scores ranging from 0 to 4 and has 11 subscales, namely, drive for thinness, bulimia, body dissatisfaction, low self-esteem, personal alienation, interpersonal insecurity, interpersonal alienation, interoceptive deficits, emotional dysregulation, perfectionism, asceticism, and maturity fears [23]. The interoceptive deficits (IDs) subscale best predicts anorexia nervosa (AN), bulimia nervosa (BN), and partial AN/BN, followed by low self-esteem (LSE) and personal alienation (PA) [23]. Cut-offs suggested by Clausen et al. (ID >9, LSE >7, PA >7) identified risk across diagnostic groups. The EDI-3 demonstrated adequate convergent and discriminant validity [24] and yielded a Cronbach's alpha of 0.813 in the current study.

Body image

Body image was assessed with a figure-rating scale based on nine silhouette drawings originally developed by Stunkard et al. and later adapted by Fallon and Rozin [25, 26]. Each silhouette corresponds to a body mass index (BMI) category (<17 to >30 kg/m^2) [27] and is scored 1 (smallest) to 9 (largest). Participants indicated their

perceived current, ideal, and most attractive silhouettes; body image satisfaction was calculated as the discrepancy between perceived current and ideal, and distortion as the discrepancy between actual BMI-based silhouette and perceived current. Weight and height measurements were taken. Weight was recorded with a calibrated digital beam scale and height with a stadiometer to the nearest decimal place. Shoes and heavy outer clothing were removed. Weight was measured to the nearest 0.1 kg and height to the nearest 0.1 cm. The body mass index was calculated by dividing the weight (kg) by the height (m) squared as per the World Health Organization (WHO) reference. Students were classified as per the 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to play of the Female Athlete Triad new triad guidelines [28], where underweight was defined as BMI ≤ 17.5, normal as BMI 17.5–24.9 and overweight as BMI.

Dieting behavior

Participants completed a weight questionnaire covering food restriction habits, motivations for weight change, and influential figures in shaping body perceptions. The EDI-3 referral form identified pathogenic weight control measures (PWCM) including bingeing, vomiting, laxative use, excessive exercise, and ≥9 kg weight loss over six months [23].

Statistical analysis

Data were analyzed for normality using the Statistical Package for Social Sciences, version 21 for Windows software program. Normally distributed data are expressed as mean and standard deviation (SD); non-parametric data were reported as median and inter-quartile ranges (IQR). Categorical data were expressed as percentage of the total group. Differences between groups (athletes and non-athletes) were analyzed using Pearson Chi-square test for categorical data. If more than 20% of the contingency cells had a value <5, a Fisher's exact test was used to compare categorical data between groups. Data from Fisher's exact tests were presented as odds ratio and 95% confidence intervals (CIs). Statistical significance was set at $p<0.05$. Effect sizes were calculated to determine practical significant differences between groups for EDI-3 subscales using Cohen's *d* effect size of 0.80, 0.50, and 0.20 to indicate strong, medium and a small effect respectively [27].

RESULTS

Participant characteristics are described in Table 1. Athletes differed significantly from the non-athletes ($p=0.030$) in the number of siblings. The athletes reported a higher number of siblings than the non-athletes. The majority of the students (92.8%) were of the Kalenjin community, with the rest 7.2% representing the Luhya, Luo, Kikuyu, Maasai, and Kamba. The majority of the students were in Form 2, which is year two of high school in the Kenyan education system.

Eating disorder psychopathology

Athletes and non-athletes presented with similar raw scores across all EDI-3 subscales (Table 2). A practical significant difference was found in the bulimia sub-scale between athletes and non-athletes. Athletes (65.5%) and non-athletes (44.9%) scored above cut-off scores for interoceptive deficits, low self-esteem (68.9% and 81.6% respectively), and personal alienation (90.2% and 83.7% respectively). Effect size analysis showed that the ID subscale had a large effect size ($d = 0.85$) when high athletes were compared to non-athletes suggesting a clinically meaningful difference. LSE and PA subscales yielded medium effect sizes ($d = 0.63$ and 0.57, respectively).

Body image

Significant differences were noted between athletes' and non-athletes' actual body silhouette categories ($\chi^2=11.153$, $p=0.01$). A sub-sample of athletes and non-athletes perceived themselves to have an overweight body silhouette whereas most had a normal weight body silhouette (Table 3).

Figure rating scale scores indicated that 80.9% participants desired a leaner body silhouette (athletes = 83.7% vs. non-athletes = 78.7%, $\chi^2 = 10.0$, $p = 0.006$), 12.7% were satisfied with their current body silhouette, and 6.4% desired a larger body silhouette. More than half (56%) of the participants desired a body size silhouette equivalent to a BMI <17.5 kg/m^2.

An equal proportion of athletes and non-athletes (67.2 vs. 67.3%, respectively) reported that the pressure to achieve a lean body shape was internally motivated. Friends played a significant role on body perception for 49.2% of athletes and 16.3% of non-athletes. Notably 36% athletes reported that they experienced pressure from the coach while 48% ascribed pressure to maintain a lean physique from training partners. For non-athletes, parents (20.4%) and the media (20.4%) appeared to play a stronger role on the perceived pressure to attain a lean body shape.

Dieting behavior

A large proportion of athletes (64%) and non-athletes (53.1%) reported to want to lose body weight. Only 1.6% athletes wanted to gain weight compared to 12.2% non-athletes. The main reason for wanting to change body weight for athletes was sports performance (90.2%) compared to appearance reasons (49%) for non-athletes. Both athletes (80.3%) and non-athletes (75.5%) reported

pressure to maintain a lean body shape and 82% of athletes reported to regulate their body weight to meet the demands of body weight requirements for their sport.

Significantly more athletes reported to restrict the types and amount of food eaten than non-athletes to control their body weight (Table 4). The top 3 food groups restricted by athletes wanting to lose weight were fats, carbohydrate rich foods and dairy products. Athletes reported to engage in compensatory behaviors in an effort to control their body weight. Figure 1 represents the use of PWCM by athletes and non-athletes. Overall more athletes than non-athletes reported to use PWCM (52.5% vs. 32.6%, p=0.031 respectively). There were no statistical differences between athletes and non-athletes across the types of PWCM investigated.

Table 1: Descriptive demographic characteristics of the total group, athletes and non-athletes

Variable	Category	Total group (N=110) %	Athletes (N=61)	Non-athletes (N=49)
Age (yrs)			16 (16;17)	17 (16; 17)
No of siblings			5 (3.5; 6)[a]	4 (3, 5.5)
Percentage per group				
Type of school	Boarding	74.5	73.5	75.4
	Day	25.5	26.5	24.6
Ethnicity	Kalenjin	92.8	98.6	85.8
	Others	7.2	1.4	14.2
Class	Form 2	43.6	42.6	44.9
	Form 3	27..3	32.8	20.4
	Form 4	29.1	24.6	34.7

Non-parametric data presented as median and interquartile ranges (25th; 75th percentile).
[a]Athletes differ significantly from non-athletes, independent *t* test, p=0.030.

Table 2: Eating Disorder Inventory-3 scores for athletes and non-athletes compared to EDI scores reported for eating disorder patients and normal controls

Eating disorder subscales	Athletes (n=61)	Non-athletes (n=49)	Clausen et al. 2011 Eating disorder patients (n=561)	Clausen et al. 2011 Normal controls (n=878)
Drive for thinness	5.6 ± 3.2	5.4±3.9	19.3±7.2	7.2±7.1
Bulimia	3 (0.0;6.0)[a]	2 (0.0;5.0)	14.4±9.4	2.5±4.3
Body dissatisfaction	5 (3.0;8.0)	5 (4.0;7.5)	27.9±10.1	15.3±11.3
Interoceptive deficits	6 (4.0;31.0)	7 (1.0;25.0)	18.7±7.3	5.5±5.9
Low self-esteem	5 (3.0;16.0)	4 (3.0;13.0)	13.2±5.5	4.0±4.6
Perfectionism	8 (4.0;24.0)	8 (3.0;24.0)	10.8±5.5	5.9±4.9
Interpersonal insecurity	5 (4.0;23.0)	7 (3.0;20.0)	10.4±5.7	5.0±4.8
Interpersonal alienation	4 (4.0;18.0)	4 (2.0;19.0)	9.4±5.6	3.7±4.3
Emotional dysregulation	6 (0.0;21.0)	7 (3.0;22.0)	9.1±5.7	3.5±4.0
Personal alienation	10.3 ± 3.2	9.5±3.8	12.5±5.4	4.0±4.5
Ascetism	9.6 ± 4.6	10.8±4.8	11.9±5.9	4.0±4.3
Maturity fears	9.9 ± 4.4	10.1±4.5	10.3±6.6	6.1±4.8

Note: Parametric variables are reported as means and standard deviation and non-parametric variables as median and inter-quartile ranges (25th–75th percentile).
[a]Athletes differ from non-athletes (d=0.3, p<0.05).

Table 3: Perceived and actual body silhouette of athletes and non-athletes

Variable	Athletes (n=61) % (n)	Non-athletes (n=49) % (n)
Perceived BMI body silhouette		
Underweight (BMI[a] <17.5 kg/m²)	8.2 (5)	0.0 (0)
Normal weight (BMI ≥ 17.5 ≤ 24.9 kg/m²)	75.4 (46)	73.5 (36)
Overweight (BMI ≥ 24.9 kg/m²)	16. (10)	26.5 (13)
Actual BMI body silhouette		
Underweight (BMI < 17.5 kg/m²)	16.1[b]	0.0 (0)
Normal weight (BMI ≥17.5 ≤ 24.9 kg/m²)	82.1	88.9
Overweight (BMI ≥ 24.9 kg/m²)	1.8	11.1

[a]BMI, body mass index.
[b]Athletes differs significantly from non-athletes ($\chi^2 = 11.153$, p = 0.01).

Table 4: Dieting behaviours of athletes and non-athletes

Variable	Athletes (N=61) % (n)	Non-athletes (N=49) % (n)
Restrict types of food to control weight	72.1(44)[a]	32.7 (16)
Restrict amount of food to control weight	68.9 (42)[b]	32.7 (16)
Food groups restricted		
Dairy (milk, cheese)	13.1 (8)	18.4 (9)
Red meat	8.1 (5)	0 (0)
Other meat/protein (chicken, turkey, fish, eggs)	6.5 (4)	18.4 (9)
Carbohydrates rich foods	14.8 (9)	18.4 (9)
Sweets (ice cream, cookies, candy)	6.5 (4)	18.4 (9)
Fats	24.5 (15)	24.5 (12)
Sweetened beverages	6.5 (4)	0 (0)
Fast food	1.6 (1)	0.2 (1)
Athletes compensatory eating behaviors		
Eat less when training is shorter or less intense	41 (25)	
Eat more when training is longer and more intense	23 (14)	
Train more on own when training session is short	80 (49)	
Worry about food and weight gain when injured or sick and out of training	43 (26)	

[a]Athletes differ significantly from non-athletes $\chi^2 = 51.55$, p = <0.01
[b]Athletes differ significantly from non-athletes $\chi^2 = 14$, p = 0.002.

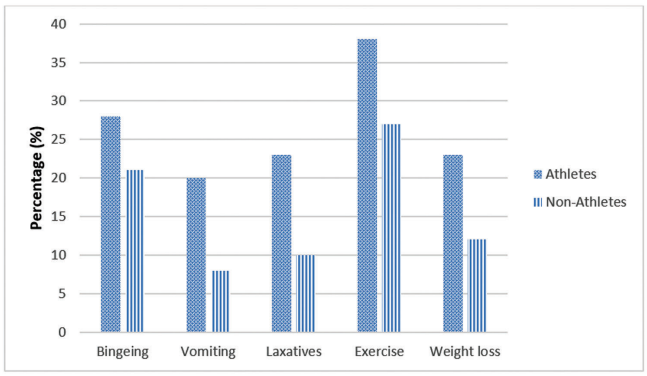

Figure 1: Percentage use of pathogenic weight control measures by athletes and non-athletes.

DISCUSSION

The main findings of this study were that a large sub-sample of participants (athletes and non-athletes) presented with high EDI subscale scores, placing them at risk of an eating disorder. Most participants desired a leaner body image of which half desired an underweight body image (BMI <17.5 kg/m²). A subgroup of participants presented with distorted body image, perceiving themselves as overweight while their actual body mass index was normal. More athletes restricted the type and amount of food and used PWCM to control body weight than non-athletes.

There is strong evidence that female athletes have a high risk for developing eating disorders, especially those competing in leanness or aesthetic sport [2, 29]. It is not clear whether race plays a role in eating disorder risk within the sporting arena as eating disorders, independent of sport, traditionally are thought to be a problem of western societies. Evidence on the risk for eating disorders among black women and girls on the African continent is mixed and may be due to the use of different screening tools, translation of tools into native language, and/or limited access to follow-up interviews for diagnosis. Hooper and Garner [29] using the original EDI among black, white and mixed race school girls in Zimbabwe, reported high scores on the psychological subscales among black girls placing them at risk of an eating disorder. Similarly, a study in Nigeria [30] reported that 14.1% black urban high-school and college students in were at risk of an eating disorder using the Eating Attitude Test-26, and 3.3% Arab secondary school girls (n=1,200) were diagnosed with a clinical eating disorder using a structured clinical interview [31]. Contrary to these findings, researchers found a low risk for eating disorders amongst 200 Tanzanian girls and women between the ages of 13 and 20 years using a Kiswahili version of the EDI [32]. Similarly, low rates of disordered eating behavior were found amongst adult Kenyan athletes [17]. This study found high scores in some subscales (interoceptive deficits, low self-esteem, personal alienation, perfectionism, ascetism, and maturity fears) among athletes and non-athletes, indicating general psychological disturbances associated with an increased risk of an eating disorder [24]. In many Kenyan communities, mental health is rarely discussed, yet these psychological disturbances may go unaddressed, increasing eating disorder risk. A plethora of risk factors for eating disorders in the general population have been identified [33]. In the current study potential risk factors for an eating disorder include general and social factors (gender, athlete), developmental factors (adolescent age), psychological and behavioral factors (dieting, restraint eating, body dissatisfaction, weight and shape concerns, perfectionism).

Adolescents preference for a lean body size in Kenya is also shaped by a combination of sociocultural influences and media exposure [34]. Globalization and digital media continue to propagate Western beauty ideals that equate thinness with attractiveness and success. Traditionally, diverse body types were celebrated and condoned but these external messages increasingly clash with local norms, creating pressure to conform to the "ideal." Additionally, peers perpetuate these ideals through praise for slenderness or criticism of weight gain. In the absence of guidance, young girls adopt restrictive eating habits or negative self-perception mistaking leanness for health.

Most participants desired a smaller body image with sports performance the main driver for athletes and appearance for non-athletes. Pressure to attain a smaller body image for athletes were mostly internally motivated followed by peers, the coach and training partners. Athletic success, particularly in long-distance running, is a highly valued opportunity for economic dominance and social recognition in Kenya, which can further reinforce leanness. Findings support those of others highlighting the role of sport-specific and peer influences as well as normal physical changes occurring during puberty on body image satisfaction [18, 35]. Furthermore, findings suggest internalization of a 'thin ideal' body image as portrayed by Western culture [36] and support the findings indicating a change in perceptions on desired body image size among black African girls towards a smaller body size [4].

Dieting behavior was prevalent among both athletes and non-athletes with significantly more athletes restricting the type and amount of food they eat to control their body weight compared to non-athletes. The top restricted foods when trying to lose weight included dietary fat, carbohydrate-rich foods, and dairy food. There was also a concern from athletes to gain weight when they were out of training, as they reported the use of compensatory behavior to control body weight when they did not engage in usual training sessions. Athletes and non-athletes reported using one or more PWCM (e.g. vomiting, use of laxatives, and bingeing) with more athletes engaging in this behavior than non-athletes. Use of PWCM by adolescents to control body weight has been reported elsewhere [16] and those engaging with these weight control behaviors as adolescents have a higher risk to continue these practices in the long-term.

Limitations of this study include a lack of a clinical interview and a small sample size which limits the ability to extrapolate findings to other non-western athletes from minority groups. Future studies can include focus group discussions to provide richer data on risk factors for disordered eating behavior to inform both primary and secondary prevention and intervention programs.

CONCLUSION

In conclusion, this group of adolescent Kenyan athletes and non-athletes presented with body image dissatisfaction, dieting behaviour and general psychological disturbance placing them at an increased risk of an eating disorder. It is imperative that students themselves, their parents, teachers and coaches are educated on healthy eating habits and body image, as well as the health and performance decrements associated with being underweight and engaging in unhealthy eating habits.

Appropriate interventions need to be grounded in realities. For example, school-based programs that integrate body image concerns into the school curriculum could be helpful in providing early awareness. It is also imperative to establish peer support forums where

students discuss self-esteem issues, media influence and healthy lifestyle choices in a safe place. Coaches need to be trained to identify signs of disordered eating behaviors in order to make appropriate referrals early enough. Additionally, training on the dangers of extreme leanness as the coaches sometimes equate low body fat with performance thus reinforcing restrictive diets. Partnerships with elders and religious leaders could also be initiated to reframe body image ideals and discourage harmful body shaming narratives while reinforcing messages of health and self-worth.

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Author Contributions
Esther Nduku Muia – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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