

BODY WEIGHT SATISFACTION AND DISORDERED EATING AMONG YOUTH WHO ARE ACTIVE IN SPORT IN SINGAPORE

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Abstract. *Purpose:* The research examined the relationship between body weight satisfaction and disordered eating among youth who are active in sport in Singapore. *Method:* 137 youths (82 boys and 55 girls; age 12-13) enrolled in school sport completed two self-report questionnaires- SCOFF for disordered eating and body weight satisfaction- on two separate occasions that were six months apart (T1 vs. T2). *Results:* Body mass index for age classifications revealed that 5.1% were severely underweight; 1.5% underweight; 88.3% acceptable weight; 4.4% overweight and 0.7% were severely overweight. *Conclusions:* (i) the prevalence of disordered eating was 46% at baseline measurement and this remained stable at 45.3% six months later; (ii) there was no sex difference for disordered eating on the two measurement occasions (T1 vs. T2, $p>0.05$); (iii) the prevalence of youths unsure of their bodyweight satisfaction was 26.6-21.2% which compared to 88.3% adjudged to be of healthy weight; across T1 and T2, more male subjects wanted to gain bodyweight while more female subjects wanted to lose bodyweight; and (iv) subjects who were dissatisfied with their bodyweight had significantly greater odds of being at risk for developing DE. Holistic education programmes based upon body image and nutrition, are recommended.

Keywords: Disordered eating, body weight, satisfaction, youth active in sport.

Introduction

Local reports on disordered eating (DE) among Singaporean youth from the age of 13 are on a rise based on figures released from local public hospital (Tan, 2013). An unexpected finding was that in 30% of DE cases are first alerted by physical education (PE) teachers in schools (Tan, 2013), suggesting that PE teachers have an important role to play in recognising early signs of DE and identifying youth at risk. Martinsen et al. (2014) showed that a 1-year intervention programme focussed on building self-esteem with social support coupled with nutrition education in schools on building self-esteem, reduced the prevalence of youth with symptoms of eating disorder and prevented new cases of eating disorders. The study showed that proactive and preventative school-based programmes targeted at youths during adolescence can mitigate the prevalence of eating disorders.

There are four main forms of eating disorders, Anorexia Nervosa (AN), Bulimia Nervosa (BN) and binge-eating disorder and eating disorders not otherwise specified (Association, 2013). Anorexia Nervosa (AN) is characterized by physical emaciation, a disproportionate fear of becoming overweight, body dissatisfaction, a denial of low bodyweight and refusal to eat. Bulimia nervosa is characterized by binge eating and compensatory behaviour (e.g. self-induced vomiting) to prevent weight gain. Binge eating is more commonly known as compulsive overeating in the absence of compensatory behaviour. Disordered eating not otherwise specified include combinations of AN, BN, binge eating or other forms of eating behaviours such as excessive night eating syndrome and nocturnal sleep-eating disorder (Association, 2013). It appears that the „genesis“ of unhealthy eating habits and DE occurs in adolescence and continues into adulthood (Neumark-Sztainer, Wall, Larson, Eisenberg and Loth, 2011) which makes it crucial to identify risk factors early so that the symptoms would not escalate further and proper medical and healthcare can be given appropriately.

Promoting sports participation is a popular means of achieving adolescent physical activity and it can also bring about many health-related benefits- physical and psychosocial benefits (Côté, Strachan, & Fraser-Thomas, 2008). Research examining whether athletes are at increased risk for eating disorder are equivocal- some show that athletes are at increased risk for eating disorders (Sundgot-Borgen & Torstveit, 2004; Torstveit, Rosenvinge, & Sundgot-Borgen, 2008) while others show no difference in risk or prevalence between athletes and non-athletes (Fogelholm & Hiilloskorpi, 1999; Fulkerson, Keel, Leon, & Dorr, 1999; Kirk, Singh, & Getz, 2001; Rosendahl, Bormann, Aschenbrenner, Aschenbrenner, & Strauss, 2009); yet others show lower risk of DE for athletes than non-athletes (DiBartolo & Shaffer, 2002; Hausenblas & McNally, 2004; Sanford-Martens, Davidson, Yakushko, Martens, & Hinton, 2005). It appears that some but not all of these disparate findings are attributed to differences in methods of research-criteria for detection of DE; non-matched control groups or grouping athletes of different sport together.

The prevalence of DE is higher among elite athletes than non-athletes especially so in weight-sensitive sports such as wrestling, gymnastics and endurance running (Sundgot-Borgen & Torstveit, 2004; Torstveit et al., 2008). Female athletes are also at higher risk when compared to male athletes especially in sport that emphasizes thinness such as dance (Sundgot-Borgen & Torstveit, 2004). Also adult athletes who were diagnosed with DE started dieting and weight control behaviour during adolescence (Sundgot-Borgen, 1994). Davies et al. (1997) reported that a large percentage of adult AN patients were engaged in an excessive amount of exercise and that this volume of exercise commenced prior to adulthood.

Body weight is suggested as a risk factor for body dissatisfaction and predictors of eating disorder (Ter Bogt et al., 2006) and it is a significant health concern among adolescents (Al Sabbah et al., 2009). Between childhood and adolescence, the onset of puberty occurs and the boy or girl experience rapid changes in their physical bodies (Gallahue

& Ozmun, 2006), and a failure to adapt to these rapid physical and psychological changes in adolescence lead to the development of psychopathology (Cattarin & Thompson, 1994). It is not uncommon to locate research that show high percentages of dissatisfaction with their bodies among Western population youth samples (Neumark-Sztainer et al., 2002). This dissatisfaction include actual and perceived weight status, negative body image, weight control practices and symptoms of eating disorders (Neumark-Sztainer et al., 2002). Not surprisingly adolescents are very sensitive to their body weight, body shape and other people's perception of their body shapes (Khor et al., 2009).

Body weight perception is a strong determinant of nutritional habits and weight management among adolescents (Brener, Eaton, Lowry, & McManus, 2004). Adolescents who are underweight or are of normal-weight but perceive themselves as overweight, are at increased risk for eating disorders such as AN (Desmond, Price, Gray, & O'Connell, 1986). On the contrary, adolescents who are overweight but do not perceive themselves as such are unlikely to engage in weight control practices such as diet or exercise (Statistics, 1997).

A study on Singaporean adolescents showed that healthy-weight adolescents reported a higher quality of life compared to obese adolescents (Østbye, Malhotra, Wong, Tan, & Saw, 2010). However, the prevalence of body weight satisfaction and DE, and the relationship between adolescent body weight satisfaction and the risk of DE among Singaporean youth remain to be elucidated

Morgan, Reid and Lacey (1999) developed a simple screening tool termed the „SCOFF“ for detecting the likelihood of eating disorders among population samples consisting of five eating-related questions that are focussed on the core characteristics of AN and BN. The questionnaire is validated as a tool for predicting eating disorder (Hill, Reid, Morgan & Lacey, 2010) and is also validated in an Asian adolescent population (Leung et al., 2009).

Purpose, tasks of the work, material and methods

The aims of the current study is to examine (i) the prevalence of DE using the SCOFF questionnaire and body weight satisfaction among sports-active youth within one academic year and (ii) relationship between bodyweight satisfaction and De in a sample of sport-active youth in Singapore.

Method

Participants

The participants were newly enrolled secondary 1 student-athletes recruited from two secondary schools in Singapore. Student-athletes are those enrolled in the school's sport team or core-curriculum activities (CCA). The students and parents were briefed about the research study and were allowed to opt out of the study if they do not wish to participate. Student assent, parents' and school principals' consent for the research were sought and granted. The approval code for institutional ethical clearance is IRB 12/04/17.

Design

The questionnaires were administered by the researchers in the presence of the physical education (PE) teacher before the commencement of the PE session or CCA training on two occasions that were six months apart. The first data collection was conducted at the start of the academic semester at the beginning of the year with a total of 153 students. After accounting for of incomplete questionnaire responses, data from 151 (98.7% response rate) students were collated. For the second data collection, 10 students were absent from school and did not complete the questionnaires and after accounting for incomplete questionnaire responses, 137 (82 males, 55 females; response rate of 90.8%) matched pairs with complete data sets were used for analysis.

Measures

Risk of DE was measured using the SCOFF questionnaire which consist of five eating-related questions (Morgan et al., 1999). Answers (yes/no) are scored by a point for a positive answer and a zero point for a negative answer. A score of two points or greater indicates a likelihood of a risk of eating disorder.

Body weight satisfaction was assessed by a bodyweight satisfaction questionnaire (Chia & Wang, 2003). The body weight questionnaire consists of five nominated questions. „I want to gain body weight“, „I am satisfied with my current bodyweight“, „I want to lose body weight“ which are assessed by a 5-point Likert scale ranging from „Strongly disagree“ to „Strongly agree“.

Anthropometric measurements (stature and body mass; BMI) were provided by the physical education teachers- measurements are taken yearly during PE sessions. BMI is derived from using the height and weight by the formula – Body mass (kg) / [Height (m) x Height (m)]. Weight status is interpreted by the guidelines issued by the health promotion board (HPB, 2002).

Data analysis

Descriptive summaries for both bodyweight satisfaction and SCOFF at baseline (T1) and follow-up (T2) time points were presented as frequency counts and percentages. Sex differences for SCOFF and bodyweight satisfaction were investigated using Pearson Chi-Squared test of independence. For the tabulation of sex differences in bodyweight satisfaction, the Likert scaled items „Strongly disagree and disagree“ were transformed to a new group „Disagree“ and items „Agree and strongly agree“ were transformed to a new group „Agree“. The item „Undecided“ was dropped from the analyses of sex differences and relationship with SCOFF. The stability of the prevalence of eating disorder was investigated using the McNemar's test. Changes in SCOFF scores between T1 and T2 were tested using Wilcoxon's signed rank test. The association between SCOFF and bodyweight satisfaction was examined using odds ratios (OR) and 95% confidence intervals (CI). The reference group for comparison was „Satisfied with bodyweight“, „Do not want to gain bodyweight“ and „Do not want to lose bodyweight“. Statistical significance is set at $p < 0.05$.

Results

Physical characteristics

The mean age of the students was 12.7 ± 0.3 yrs; male 12.6 ± 0.3 yrs and female 12.7 ± 0.3 yrs. The mean height was 156.0 ± 12.9 cm; male 155.5 ± 10.0 cm and female 156.8 ± 16.5 cm. The mean body mass was 46.4 ± 10.2 kg; male 44.7 ± 10.3 kg and female 49.1 ± 9.5 kg. BMI-for-age for both sexes was used to classify weight status based on the percentile chart of the MOH Singapore. Seven (5.1%) of the subject pool were severely underweight, two (1.5%) were underweight, 121 (88.3%) were of acceptable weight, six (4.4%) were overweight and 1 (0.7%) was severely overweight. Student-athletes were involved in both individual (badminton, track and field, tennis) and team-based sport (netball, soccer, hockey).

SCOFF

Table 1 outlines the proportion of male and female athletes in the responses to each SCOFF item. There is no significant sex difference between those identified at risk of eating disorder at T1 and at T2 measurements ($p=0.55$; 0.15). Female athletes scored significantly higher in item 2 on „Do you worry you had lost control over how much you ate“ at T2 ($\chi^2=4.68$, $p<0.05$). The prevalence of being at risk of DE remained stable at T2 (McNemar $P>0.05$). A total of 46.0% (N=63) of participants reported being at risk at T1 and 45.3% (N=62) at T2. There is no significant change in SCOFF scores between T1 and T2 ($z=-0.7$, $p=0.94$).

Table 1

Responses (%) to items of SCOFF at baseline (T1) and follow-up (T2) time points (6 months apart)

	Total (n=137)		Male (n=82)		Female (n=55)		Pearson Chi Square χ^2		p value	
	T1 (%)	T2 (%)	T1 (%)	T2 (%)	T1 (%)	T2 (%)	T1	T2	T1	T2
Have you made yourself sick because you felt uncomfortably full?	17.5	12.4	20.7	11.0	12.7	14.5	1.46	0.39	0.22	0.53
Did you worry you had lost control over how much you ate?	40.1	41.6	39.0	34.1	41.8	52.7	0.11	4.68	0.74	0.03*
Have you lost more than 6.45 kg in a 3-month period?	13.1	8.8	14.6	12.2	10.9	3.6	0.50	3.02	0.53	0.08
Do you believe yourself to be too fat when others say you were too thin?	27.0	35.0	23.2	29.3	32.7	43.6	1.53	2.99	0.22	0.08
Would you say that food dominated your life?	42.3	45.3	39.0	41.5	47.3	50.9	0.92	1.19	0.34	0.28
Answered „Yes“ to 2 or more.	46.0	45.3	43.9	40.2	49.1	52.7	0.36	2.07	0.55	0.15

% of respondent within gender, * χ^2 significant at $p<0.05$

Bodyweight satisfaction

Descriptive scores of bodyweight satisfaction are presented in Table 2. The responses of „I am satisfied with my current bodyweight“ remains stable from T1 to T2 measurement (McNemar $P>0.05$). Responses to „I want to gain bodyweight“ and „I want to lose bodyweight“ remains unchanged from T1 to T2 (McNemar $P>0.05$). Sex differences in bodyweight satisfaction are presented in Table 3.

Table 2

Distribution of responses of bodyweight satisfaction

Baseline (T1)	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I am satisfied with my current Bodyweight	7 (5.1%)	36(26.3%)	31(22.6%)	42(30.7%)	21(15.3%)
I want to lose body weight	23(16.8%)	21(15.3%)	37(27%)	35(25.5%)	21(15.3%)

Baseline (T1)	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I want to gain body weight	38(27.7%)	31(22.6%)	34(24.8%)	25(18.2%)	9(6.6%)
Follow-up (T2)					
I am satisfied with my current Bodyweight	13(9.5%)	32(23.4%)	29(21.2%)	44(32.1%)	19(13.9%)
I want to lose body weight*	27(20.0%)	19(13.3%)	40(29.6%)	31(23.0%)	19(13.9%)
I want to gain body weight	33(24.1%)	33(24.1%)	34(24.8%)	21(15.3%)	16(11.7%)

*2 missing data for item “I want to lose bodyweight” at T2. Sample size for rest of items at N=137.

Table 3

Sex difference of bodyweight satisfaction

	Respondent (%) Male	Respondent (%) Female	Pearson Chi square χ^2	p Value
Baseline (T1)				
Bodyweight Dissatisfaction	41.0	40.0	0.01	0.92
I want to gain body weight	44.4	15.0	9.59	<0.05*
I want to lose weight	46.6	69.0	5.00	0.03*
Follow-Up(T2)				
Bodyweight Dissatisfaction	44.8	36.6	0.70	0.40
I want to gain body weight	50.8	14.3	14.42	<0.05*
I want to lose weight	35.6	80.6	18.13	<0.05*

% of respondent within gender, * χ^2 significant at $p < 0.05$

Relationships between SCOFF and bodyweight satisfaction at T1 and T2

At T1, subjects who were not satisfied with bodyweight were significantly at higher odds for developing a DE (OR: 3.63, CI: 1.61 – 8.19); there is no significant differences for the odds of developing a DE between subjects who „Want to gain bodyweight“ and subjects who „Do not want to gain bodyweight“ (OR:0.51, CI:0.22-1.17). Subjects who „Want to lose bodyweight“ were at significantly at greater odds of developing a DE (OR: 3.77, CI: 1.64, 8.66). At T2, female subjects were at significantly at greater odds of developing DE for those that were dissatisfied with bodyweight and for those who „Want to lose bodyweight“ (OR: 6.50, CI:1.22-34.72), (OR:13.3, CI:1.39,127.58). Table 4 presents a summary of these results at T1 and T2.

Table 4

Summary of Odds ratios between bodyweight satisfaction and risk of eating disorder

Baseline (T1)	Overall		Male		Female	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Dissatisfied with Bodyweight Overall (n=106) Male (n=61) Female (n=45)	3.63*	1.61 – 8.19	3.31*	1.13-9.70	4.42*	1.21 – 16.12

	Overall		Male		Female	
Want to gain Body Weight Overall (n=103) Male (n=63) Female (n=40)	0.51	0.22 – 1.17	0.53	0.19 – 1.45	0.70	0.12 – 3.99
Want to lose Body Weight Overall (n=100) Male (n=58) Female (n=42)	3.77*	1.64 – 8.66	3.64*	1.23 – 10.79	4.28*	1.05-17.42
Follow-up						
Dissatisfied with Bodyweight Satisfaction Overall (n=108) Male (n=67) Female (n=41)	1.71	0.79- 3.70	1.12	0.42-2.98	6.50*	1.22- 34.72
Want to gain Body Weight Overall(n=103) Male (n=61) Female (n=42)	0.65	0.28 -1.47	1.25	0.45 – 3.49	0.14	0.15 – 1.35
Want to lose Body Weight Overall (n=95) Male (n=59) Female (n=36)	3.0*	1.30 -6.94	1.56	0.53-4.60	13.3*	1.39-127.58

Reference group for comparison: Baseline (T1) and follow-up (T2)- Satisfied with bodyweight, Do not want to gain weight, Do not want to lose weight. Odds ratios are considered statistically significant ($p < 0.05$) if 1.0 is not included within the confidence interval; for clarity, an * is placed next to these odds ratios

Discussion

The first aim of the study was to investigate the prevalence of DE among Singaporean youth who are active in sport using the SCOFF questionnaire. SCOFF results showed that the prevalence rates of eating disorder were at 46.0% at T1 and remained relatively stable at 45.3% at T2. Rosen (2002) reported that patients with DE often try to hide their illness but this was not the case in the present study which showed a relatively high prevalence among Singaporean youth who were at risk for DE. This is somewhat surprising since athletes who are engaged in competitive sports are reluctant in disclosing their symptoms and behaviour for fear of judgement or adverse consequences in securing their places the team sport and in selection for competition (Byrne & McLean, 2001). The current results are in agreement with the high rates for DE reported for Hong Kong youths (Leung et al., 2009). In the current study at T1, no sex difference was detected for DE which is in conflict with other studies which show that female subjects are more at risk for DE than male subjects (Hautala et al., 2011). However, at T2 (six months later), significantly more female than male subjects reported that they had lost control over how much they ate (symptom for binge-eating disorder). In agreement, the prevalence of binge-eating disorder was also reported to be high among Israeli adolescent girls (Kaluski, Natamba, Goldsmith, Shimony, & Berry, 2008). Chia et al (2002) reported that binge eating disorder was highly prevalent among Singaporean adults, more prevalent than AN or BN and deserves greater research attention in terms of its aetiology and treatment.

Another notable finding of the study was the high percentage of respondents who were „undecided“ in terms of bodyweight satisfaction (22.6%) and double-digit percentages indicating intentions to lose body weight (more prevalent in female subjects) or to gain body weight (more prevalent in male subjects) when 88.3% of the sample were adjudged as normal weight. Explanations for these observations are that muscularity is associated with being „stronger“ for the males while thinness is associated with being „ideal“ or „attractive“ for the females (Byrne & McLean, 2001). Both male and female athletes might also be pressured from within their sport (speculative in the context of the present study as these data were not collected) to conform to an „ideal“ body shape and weight for reasons of athletic performance (Byrne & McLean, 2001). These observations affirm the developmental model of body dissatisfaction, where girls become more body dissatisfied during adolescence as they move away from the thin-ideal through weight gain from growth, and boys becoming more satisfied as they move toward the mesomorphic ideal (Smolak, Levine, & Thompson, 2001). Therefore, males are more likely to engage in behaviours to increase weight and musculature while girls would

seek to lose their bodyweight (McCabe & Ricciardelli, 2004; McCabe, Ricciardelli, & Banfield, 2001). In the context of the present study, this is a „disconnect in perception“ among Singaporean youth that deserves amelioration and education.

Some studies show that female athletes competing in sports where „Jeanness“ is emphasized such as gymnastics and dance have higher prevalence of eating disorders and inappropriate eating behaviours (Sundgot-Borgen & Torstveit, 2004; Torstveit et al., 2008) and that adolescent male athletes engaged in „weight sensitive“ sports are also at higher risk (Peixoto Labre, 2002). The present results indicate a stability of risks of DE and of body dissatisfaction among male and female athletes. These results are consistent with adolescents in Western contexts where researchers report stability of weight satisfaction over a two-year period (Tiggemann, 2005), albeit different questionnaire sets were used across the two studies so deductions from the results have to be made with caution.

The relationship between DE and bodyweight satisfaction was also examined in the present study. At T1, both male and female subjects were at significantly higher odds for DE when they were not satisfied with their bodyweight. However, at T2, the odds decreased for male athletes but increased for female athletes indicating that the latter group was more susceptible to the risk of DE in latter part of adolescence. This could be explained by the different timing and tempo and physical changes that are associated with male and female puberty during adolescence. As girls physically mature in adolescence, they begin to gain weight which correspond to them being dissatisfied with their body (Richards, Boxer, Petersen, & Albrecht, 1990). Conversely, at T2, as male athletes, progress through puberty, they tend to put on more muscle and move toward the perceived „mesomorphic ideal“ and this could account for a reduction in bodyweight dissatisfaction. In reporting the results of the present study, it is noteworthy to highlight that the CI of the odds ratios were wide- indicating that there is a wide dispersion of the results. Therefore the certainty of the odds ratio cannot be conclusive and further research using larger samples in specific sport may shed greater light into the issue (du Prel, Hommel, Röhrig, & Blettner, 2009).

Limitations

Prevalence estimates for DE are difficult to compare across studies due to the differences in methods employed in research across different contexts, culture, country and sport. The issue is also exacerbated by the lack agreement for descriptions and diagnosis of DE (Patel, Greydanus, Pratt, & Phillips, 2003). Clinical examinations are needed confirm that those identified at risk of DE through the SCOFF are indeed suffering the illness and this represents fertile ground for future research.

Conclusions

The prevalence of DE among Singaporean youth is comparable to those of Hong Kong and is relatively high. Engagement in youth sport does not appear to protect against the risk of DE or against bodyweight dissatisfaction and might exacerbate these risks. The present findings and observations across T 1 and T2 parallel findings reported elsewhere- male subjects want to gain weight while female subjects want to lose bodyweight during adolescence. There is a need to amelioration through more education about healthy weight, appropriate eating and issues that are associated with DE among Singapore youth.

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