RESEARCH

Open Access



Exploring eating disorder risk among Thai transfeminine youth: a comparative study with cisgender females

Nadvadee Aungkawattanapong^{1†}, Orapa Suteerojntrakool^{1†}, Thitaporn Prownpuntu¹ and Chansuda Bongsebandhu-phubhakdi^{1,2*}

Abstract

Background Adolescents, particularly vulnerable during puberty, often face heightened concerns about dieting and body image. Transfeminine youth, especially in Asian cultures, are understudied in this context. This study investigates eating disorder risks among Thai transfeminine youth and compares to cisgender females, focusing on the association with body dissatisfaction. This study aims to explore 3 objectives: (1) to assess and compare the prevalence of eating disorder risks between Thai transfeminine youth and cisgender females; (2) to examine the link between body dissatisfaction and eating disorder risks; (3) to identify risk factors associated with abnormal eating disorder screening outcomes.

Method This is a cross-sectional comparative study conducted between September 2021 and October 2022. The study questionnaire includes Thai version of the Eating Attitude Test-26 (EAT-26) to assess the risks of eating disorders and Thai version of the Body Image Concern Inventory (BICI) to assess body dissatisfaction. The questionnaire was distributed through social media platforms to transfeminine and cisgender females, aged 12–25 years. The correlation between eating disorder risks and body dissatisfaction was analyzed with linear regression, while the comparisons between transfeminine individuals and cisgender female groups were analyzed with Wilcoxon rank-sum test.

Results The study included 241 transfeminine individuals and 388 cisgender females, median age 19.0 years (interquartile range [IQR] 18–21) and 18 years (IQR 16–20), respectively. Ninety (37.3%) transfeminine individuals had an EAT-26 score \geq 20, suggesting concerns for dieting and eating behaviors, compared to 70 (18%) cisgender females (p < 0.001). Risk factors for EDs included obesity (odds ratio [OR] 3.22, confidence interval [CI] 1.36–7.6) and low income (OR 3.66, CI 1.59–8.4). Protective factors were negligible exercise (OR 0.24, CI 0.09–0.66), gender identity disclosure (OR 0.27, CI 0.1–0.77), and high levels of happiness (OR 0.85, CI 0.73–0.98). There is a significant correlation between the positive eating behavior screening and the body dissatisfaction scores.

[†]Nadvadee Aungkawattanapong and Orapa Suteerojntrakool are co-first authors with equal contribution.

*Correspondence: Chansuda Bongsebandhu-phubhakdi chansuda.b@gmail.com; chansuda.b@chula.ac.th

Full list of author information is available at the end of the article



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

Conclusions Transfeminine youths show significantly higher concerns about dieting, body weight, and eating behaviors than their cisgender females, highlighting the unique challenges they face. These results emphasize the needs for targeted screening, health care access for treatment and support for eating disorders in transfeminine youths.

Plain English summary

Teenagers often worry intensely about their body image, a concern that can escalate to eating disorders. Transfeminine teenagers—those assigned male at birth who identify and express themselves as female—may encounter even greater challenges, yet research on this topic, especially in Asian contexts, remains sparse. This study investigated the eating habits of transfeminine teenagers in Thailand and compared them with those of their cisgender female counterparts. Conducted online with participants aged 12 to 25 from September 2021 to October 2022, the results indicate that transfeminine youths are more susceptible to behaviors that heighten the risk of eating disorders. Contributing factors include obesity and low income, which exacerbate these risks, while openly disclosing their gender identity and experiencing high levels of happiness appear to offer some protective effects. These findings underscore the urgent need for enhanced support and greater awareness for transfeminine adolescents at risk.

Keywords Eating disorder, Transgender, Transfeminine Person, Thai

Introduction

Most of the research on eating disorders (EDs) has focused primarily on cisgender individuals, often overlooking the unique experiences of transgender populations. Studies analyzing youth-risk behavior survey data indicate that sexual minorities especially transgender youth, exhibit significantly more unhealthy and disordered weight control practices compared to their heterosexual counterparts [1, 2].

A meta-analysis demonstrated that the risk of ED in transfeminine individuals aligns more closely with that of cisgender women than with cisgender men [2]. Additionally, a study exploring the relationship between gender roles and eating disorder attitudes reveal that femininity is positively correlated with eating problems, whereas masculinity often serves as a protective factor, independent of biological gender [3, 4].

Several factors contribute to an increased risk of ED among transgender individuals. Lower socioeconomic status, frequently associated with stress, trauma, and negative emotional states, significantly influences the development and maintenance of EDs [5]. In addition, societal pressures around body image, particularly the idealization of thinness, may compel transgender women to pursue weight loss, exacerbating their risk of eating disorders [6]. Previous research in adult transgender individuals indicated that a higher BMI was associated with increased behaviors related to the bulimia and food preoccupation, as well as the oral control subscale scores of eating disorder screening [7]. Conversely, treatment for gender dysphoria has been shown to enhance body satisfaction, potentially mitigating the risk of EDs [6, 8].

Despite growing interest, research on eating disorder risks among specific populations remains limited, especially when compared to their cisgender counterparts. Most existing studies are concentrated in North America, Europe, and Australia [9], leaving a gap in knowledge from other cultural contexts, particularly in Asian countries. In Thailand, assessments of eating disorder risks among transgender females are notably scarce. Only one study from Bangkok has indicated that 13% of the participants (28 out of 217 Thai transfeminine adults) were at high risk for eating disorders, according to the online EAT-26 questionnaire [7].

This study aims to bridge existing knowledge gaps by establishing three key objectives: (1) to determine the prevalence of eating disorder risks among Thai transfeminine youth and compare these risks to those observed in cisgender females; (2) to evaluate the association between eating disorder risks and body dissatisfaction; (3) to identify the risk factors associated with abnormal eating disorder screening results.

Method

Study population

The study employed a cross-sectional design from September 2021 to October 2022, targeting participants aged 12 to 25 years who identified as transfeminine individuals and cisgender females. Recruitment was conducted online using a network of gender health clinics and social media platforms including LINE, Facebook, and Twitter. Participants completed surveys via Google Forms to maintain anonymity and confidentiality. Access to the data was restricted to authorized personnel only. Participants were encouraged to share the survey with their transfeminine peers and relevant online groups. The study excluded individuals with cognitive and/or vision disabilities to ensure self-administered responses.

Ethical approval was obtained from the Institutional Review Board of the Chulalongkorn University Faculty of Medicine, Bangkok, Thailand (approval number 613/64). The purpose of the study was clearly articulated to the participants, who gave their implied consent to participate voluntarily. For those aged 12–18 years, parental consent was not required due to low risk and to protect the confidentiality of their LGBTQ identity. No personal identifiers were collected to maintain privacy.

In this study, 268 transfeminine and 403 cisgender female adolescents initially participated. However, 27 transfeminine and 15 cisgender female adolescents were excluded due to unconfirmed gender identity and incomplete responses. Consequently, 241 transgender female (90%) and 388 cisgender female adolescents (96%) were retained for analysis.

Questionnaire

The questionnaire was divided into four parts: (1) questions to verify participants' sex assigned at birth and their gender identity, (2) sociodemographic data collection, (3) anthropometric data gathering, and (4) administration of the Eating Attitudes Test (EAT-26) to assess the symptoms and concerns characteristic of EDs [10, 11], as well as the Body Image Concern Inventory (BICI) items to evaluate the participants' body image perceptions [12, 13] The questionnaire was provided in Thai (Supplement 1 A contains the original questionnaire in Thai and Supplement 1B contains the English-translated version). All responses were self-reported by participants.

In the study, participants' gender identity was ascertained through a binary choice question asking whether they identified as transfeminine or cisgender female. For those transfeminine individuals, the study repeated this question in the sociodemographic section. The second gender identity question was phrased as follows: "Some people describe themselves as transfeminine when their sex at birth was male, but they think or feel their gender is female. Are you transfeminine (in Thai language: kathoey, phuying kham phet, and sao praphet song)?" Four response choices were provided: (A) No, I am not a transfeminine person; (B) Yes, I am a transfeminine person; (C) I am not sure if I am a transfeminine person; (D) I do not know what this question means [14].

The second part of the survey included questions on gender, age, exercise frequency, the Patient Health Questionnaire-Adolescence (PHQ-A), happiness score, socioeconomic status (monthly income), and use of gender-affirming hormones. Respondents rated their happiness on a scale from 0 to 10. Exercise frequency was classified into two categories: regular exercise, defined as more than three times a week, and irregular exercise, defined as less frequent. Hormone use was categorized into 'ever used' and 'never used.'

The anthropometric section of the survey collected data on weight, height, BMI, and waist circumference.

BMI was calculated with the formula: weight (kg)/ height² (m²), and categorized into five groups according to Thai growth charts for age and sex: severely underweight (<16.5 kg/m²), underweight (below -2SD for age or 16.5–18.5 kg/m²), normal (-2SD to +1SD for age or 18.5–23 kg/m²), overweight (+1SD to +2SD for age or 23–24.9 kg/m²), and obese (above +2SD for age or ≥ 25 kg/m²) [15]. For transfeminine individuals, categorization used male growth charts. High waist circumference was defined as more than 90 cm for transfeminine and more than 80 cm for cisgender female, according to the guidelines of The Royal College of Pediatricians of Thailand [16].

EAT-26 is comprised of two main components: (1) the Eating Attitudes Test, which includes 26 items, and (2) a set of five behavioral questions reviewing the past six months to identify possible eating disorder symptoms or recent significant weight loss. Meeting one or more of these criteria indicates a positive screening, prompting the need to consult a professional specializing in the evaluation and treatment of eating disorders [10, 11]. In this research, we focused on assessing the eating attitude part and the behavioral questions related to potential eating disorder symptoms or significant weight loss.

The eating attitudes assessment (part A of EAT-26) consists of three subscales: dieting, bulimia and food preoccupation, and oral control. For questions 1 to 25, scores are assigned based on the frequency of certain eating behaviors: 'Always' receives a score of 3, 'Usually' 2, 'Often' 1, and 'Sometimes,' 'Rarely,' and 'Never' are all scored as 0. For question 26, the scoring is reversed: 'Always,' 'Usually,' and 'Often' score 0, while 'Sometimes' scores 1, 'Rarely' 2, and 'Never' 3. A cumulative score of 20 or more suggests significant concern regarding eating attitudes and behaviors, indicating a potential eating disorder (supplement 1 A and 1B).

Part B of the EAT-26 questionnaire encompasses behavioral questions including A) Incidences of uncontrollable eating binges, B) Instances of self-induced vomiting for weight or shape control, C) Use of laxatives, diet pills, or diuretics for weight or shape management, D) Exercise for more than 60 minutes daily for weight loss or control, E) Loss of 20 pounds or more in the past six months. Responses are categorized by frequency, ranging from 'Never' to 'Once a day or more'. Respondents are asked to indicate the frequency of each behavior with either 'Yes' or 'No'. Interpretations of these responses are guided by specific criteria as referenced [10]. The Thai version of the EAT-26 has been validated and is recommended for diagnosing eating disorders among Thai females. The Thai version of EAT-26 has been validated and is recommended as a useful tool for diagnosing EDs among Thai females [17].

Body Image Concern Inventory (BICI), developed by Heather Littleton [12, 13] and licensed in February 2021, is a validated self-report tool with high internal consistency (Cronbach's alpha=0.93). It assesses dysmorphic concerns through 19 items in six domains, including behaviors related to appearance checking, social anxiety, and dissatisfaction. Using a Likert scale ranging from 1 (never) to 5 (always), it identifies higher levels of body image dissatisfaction, with scores over 72 indicating potential clinical concern for body dysmorphic disorders or EDs. BICI has been translated into Thai by the Chalermprakiet Centre for Translation and Interpretation at Chulalongkorn University, Bangkok.

Statistical analyses

The characteristics of the participants were described as follows: Continuous variables are expressed as median (interquartile range: IQR) for non-normal data distribution and mean with standard deviation (SD) for normal data distribution, while frequency and percentage are used for categorical variables.

The Shapiro–Wilk test was used to test for normality of data. Differences in continuous variables between two groups were evaluated using the Wilcoxon rank-sum test for non-normal data distribution and the two independent t-tests for normal data distribution. Categorical data were compared using the Chi-square test or Fisher's exact test.

To assess correlations, Spearman rank correlation was performed between BICI and EAT-26 scores. Linear regression was utilized to examine the relationship between positive EAT-26 screening and BICI score. Logistic regression was conducted to identify risk factors associated with EAT-26 scores \geq 20.

Multivariate analyses were conducted by incorporating covariates that had a p-value of <0.2 in the univariate analyses. As a result, the following covariates were included in the final model: BMI by age, frequency of exercise, use of gender-affirming medicine or hormones, gender identity disclosure, and happiness score. All reported p-values are two-sided, and statistical significance was defined as p<0.05. Analyses were conducted using Stata version 15.1 (Stata Corp., College Station, Texas) and GraphPad Prism version 8.0.1.

Results

Table 1 presents demographic information and age group distribution among a total of 629 participants. The median age for the total group was 18 years, with an interquartile range (interquartile range: IQR) of 17–20 years. This median age slightly varied between groups, being 19 years (IQR 18–21) for transfeminine and 18 years (IQR 16–20) for cisgender females (p<0.001).

BMI classifications across age groups were similar for both transfeminine and cisgender females, showing significant variance in their distribution (p < 0.001). However, the percentage of high waist circumference and the frequency of exercise displayed no statistically significant differences.

Notably, 91.7% of the transfeminine participants disclosed their gender identity to other(s). The use of gender-affirming medicine or hormones was reported by 88.8% of the transfeminine group. The average happiness score was 7.1 (SD=1.9) for transfeminine participants, higher than the cisgender female group's 6.5 (SD=1.8), with a statistically significant difference (p<0.001). The median scores on the version of the PHQ-A were 9 for both groups.

The prevalence of eating disorder risks among transfeminine individuals, as indicated by various assessment parameters in the questionnaires, highlights significant concerns. Specifically, 37.3% (90 out of 241) scored \geq 20 on the EAT-26, indicating a high risk. Additionally, 69.7% (168 participants) tested positive on behavioral screenings for eating disorders. When combining the EAT-26 scores with the behavioral question results, 75.9% (183 participants) either scored high or exhibited potential symptoms of eating disorders (Table 2).

In a comparative analysis with cisgender females, the EAT-26 scores demonstrated significant disparities between the transfeminine and cisgender female cohorts. Specifically, the median eating score for the transfeminine group was 13 (IQR 6 to 28), whereas the cisgender female group exhibited a median score of 7 (IQR 4 to 15) (p<0.001), as depicted in Fig. 1. Further subgroup analysis, as presented in Table 2, highlighted statistically significant variations across various parameters including age group, BMI by age, waist circumference, and frequency of exercise.

Further subscale analysis of EAT-26 scores (part A: Eating Attitudes Test) compared median scores and interquartile ranges (IQRs) across the Dieting, Bulimia & Food Preoccupation, and Oral Control scales between transfeminine individuals and cisgender females (Supplement 2). Transfeminine individuals exhibited higher scores on the Dieting scale (median 7, IQR 3–16, p<0.001), Bulimia & Food Preoccupation (median 2, IQR 0–7, p<0.001), and Oral Control (median 4, IQR 1–7, p<0.001) compared to cisgender females, highlighting significant differences across all dimensions.

Additionally, the assessment of behavioral questions covered: (1) binge eating, (2) self-induced vomiting, (3) use of laxatives, diet pills, or diuretics, (4) excessive exercise, and (5) weight loss of 20 pounds or more in the past six months. This analysis revealed that transfeminine individuals had statistically significantly higher overall and individual item scores compared to their cisgender

	Transfeminine (N=241)	Cisfemale (N=388)	Total (N=629)	<i>p</i> - value
Age (years), median (IQR)	19 (18–21)	18 (16–20)	18 (17–20)	< 0.001**
Age group, n (%)				< 0.001**
12–13 years old	6 (2.5)	17 (4.4)	23 (3.7)	
(early adolescent)				
14–17 years old (middle adolescent)	40 (16.6)	83 (21.4)	123 (19.6)	
18–21 years old (late adolescent)	137 (56.9)	250 (64.4)	387 (61.5)	
22–25 years old	58 (24.1)	38 (9.8)	96 (15.3)	
(young adult)				
BMI by age, n (%)				< 0.001**
Severe Underweight	17 (7.1)	30 (7.7)	47 (7.5)	
Underweight	65 (27)	99 (25.5)	164 (26.1)	
Normal	102 (42.3)	164 (42.3)	266 (42.3)	
Overweight	23 (9.5)	38 (9.8)	61 (9.7)	
Obese	34 (14.1)	57 (14.7)	91 (14.5)	
High waist circumference, n (%)	27 (11.2)	62 (16)	89 (14.2)	0.09
Frequency of Exercise, n (%)				0.63
Never	68 (28.2)	121 (31.2)	189 (30.1)	
Irregular ^a	145 (60.2)	229 (59)	374 (59.5)	
Regular ^a	28 (11.6)	38 (9.8)	66 (10.5)	
Gender identity disclosure, n (%)	221 (91.7)	N/A	N/A	-
Gender affirming medicine or hormone: yes, n (%)	214 (88.8)	N/A	N/A	-
Monthly household income, n (%)				0.04*
< 30,000 baht (< 860 USD)	128 (53.1)	173 (44.6)	301 (47.9)	
30,000–50,000 baht (860–1450 USD)	63 (26.1)	101 (26)	164 (26.1)	
>50,000 baht (>1450 USD)	50 (20.8)	114 (29.4)	164 (26.1)	
Happiness score, mean ± SD	7.1±1.9	6.5 ± 1.8	6.7 ± 1.9	< 0.001**
PHQ-A, median (IQR)	8 (5–13)	9 (5–13)	9 (5–13)	0.16

Table 1 Demographic characteristic of the study participants

BMI; body mass index, EAT-26; Eating Attitudes Test-26, IQR; interquartile range, N/A; not applicable, PHQ-A; Patient Health Questionnaire-Adolescence, USD; United States dollar

^a regular exercise was defined as exercise more than 3 times a week, irregular exercise was defined as exercise less than 3 times a week

*p < 0.05, ** p < 0.001 (Two independent sample t-test)

female counterparts (p < 0.001), as detailed in supplement 3.

Interestingly, the analysis of the correlation between positive EAT-26 screenings and BICI scores reveals varying relationships. An EAT-26 score of 20 or higher alone indicates a weak, non-significant negative correlation (coefficient -0.1, p=0.313, $R^2 = 0.007$). In contrast, positive eating behavior screening alone, or combined with an EAT-26 score \geq 20, demonstrates significant positive correlations (coefficients 5.9 and 10.9 respectively, both p<0.001), with explained variances of 3.1% and 7.0%. When considering either condition—EAT-26 score \geq 20 or positive behavior—the correlation remains strong and positive (coefficient 6.52, p<0.001, $R^2 = 0.030$) (Table 3).

Regarding factors associated with EAT-26 scores (part A: Eating Attitudes Test) \geq 20, significant associations were observed across multiple variables (Table 4). Notably, obese individuals demonstrated a higher likelihood of elevated EAT-26 scores in both univariate (OR 2.84,

95% CI 1.27–6.32, p=0.01) and multivariate analyses (Adjusted OR 3.22, 95% CI 1.36–7.60, p=0.008). Frequency of exercise also showed significant associations; those who never exercised had reduced odds of high EAT-26 scores in the multivariate model (Adjusted OR 0.24, 95% CI 0.09–0.66, p=0.006). Disclosure of gender identity was inversely related to high EAT-26 scores (Adjusted OR 0.27, 95% CI 0.10–0.77, p=0.01), as was a higher happiness score (Adjusted OR 0.85, 95% CI 0.73–0.98, p=0.03). Moreover, individuals with a monthly household income below 30,000 Baht (<860 USD) showed a threefold increase in odds (Adjusted OR 3.66, 95% CI 1.59–8.40, p=0.002).

Discussion

The study highlights a significant risk for EDs among transfeminine youth, with a prevalence rate of 37.3% as reflected by EAT-26 scores over 20, compared to 18% in cisgender females. This finding aligns with previous

	EAT-26 Score≥20 [†]		Positive screening of behavioral questions [‡]			EAT-26 Score $\ge 20^{\dagger}$ or Positive screening of behavioral questions [‡]			
	Trans feminine	Cisgender female	<i>p</i> - value	Trans feminine	Cisgender female	<i>p</i> - value	Trans feminine	Cisgender female	<i>p</i> - value
	(N=241)	(N=388)	_	(N=241)	(N=388)	_	(N=241)	(N=388)	_
	n/total (%)	n/total (%)	_	n/total (%)	n/total (%)	_	n/total (%)	n/total (%)	_
	90 (37.3)	70 (18)	< 0.001**	168 (69.7)	192 (49.5)	< 0.001**	183 (75.9)	209 (53.9)	< 0.001**
Age group									
12–13 years old (early adolescent)	3/6 (50)	4/17 (23.5)	0.32	5/6 (83.3)	8/17 (47.1)	0.123	5/6 (83.3)	8/17 (47.1)	0.123
14–17 years old (middle adolescent)	13/40 (32.5)	17/83 (20.5)	0.15	25/40 (62.5)	40/83 (48.2)	0.136	27/40 (67.5)	46/83 (55.4)	0.201
18–21 years old (late adolescent)	49/137 (35.8)	41/250 (16.4)	< 0.001**	95/137 (69.3)	128/250 (51.2)	0.001**	105/137 (76.6)	135/250 (54)	< 0.001**
22–25 years old (young adult)	25/58 (43.1)	8/38 (21.1)	0.03*	43/58 (74.1)	16/38 (42.1)	0.002**	46/58 (79.3)	20/38 (52.6)	0.006**
BMI by age									
Severe Underweight	3/17 (6.4)	0/30 (0)	0.29	12/17 (70.6)	11/30 (36.7)	0.025*	12/17 (70.6)	12/30 (40)	0.044*
Underweight	20/65 (30.8)	10/99 (10.1)	0.001**	40/65 (61.5)	38/99 (38.4)	0.004*	42/65 (64.6)	40/99 (40.4)	0.002*
Normal	37/102 (36.3)	30/164 (18.3)	0.001**	69/102 (67.7)	86/164 (52.4)	0.014*	75/102 (73.5)	95/164 (57.9)	0.010*
Overweight	12/23 (52.2)	11/38 (29)	0.07	17/23 (73.9)	19/38 (50)	0.066	21/23 (91.3)	20/38 (52.6)	0.002*
Obese	21/34 (61.8)	16/57 (28.1)	0.002*	30/34 (88.2)	38/57 (66.7)	0.022*	33/34 (97.1)	42/57 (73.7)	0.005*
Waist circumference									
Normal	75/214 (35.1)	55/326 (16.9)	< 0.001**	146/214 (68.2)	151/326 (46.5)	< 0.001*	159/214 (74.3)	165/326 (50.8)	< 0.001*
High waist circumference	15/27 (55.6)	15/62 (4.2)	0.004*	22/27 (81.5)	41/62 (66.1)	0.143	24/27 (88.9)	44/62 (71)	0.067
Frequency of Exercise									
Never	22/68 (32.4)	23/121 (19)	0.04*	45/68 (66.2)	52/121 (43)	0.002*	50/68 (73.5)	57/121 (47.1)	< 0.001*
Irregular ^a	53/145 (36.6)	38/229 (16.6)	< 0.001**	100/145 (69)	118/229 (51.5)	0.001*	107/145 (73.8)	129/229 (56.3)	0.001*
Regular ^a	15/28 (53.6)	9/38 (23.7)	0.01*	23/28 (82.1)	22/38 (57.9)	0.037*	26/28 (92.9)	23/38 (60.5)	0.003*

Table 2 Comparison of proportions at risk of eating disorders (EAT-26 score; part A: Eating Attitudes Test) $\ge 20^{\dagger}$ and positive screening of behavioral questions between transfeminine and cisgender female groups

BMI; body mass index, EAT-26; Eating Attitudes Test-26

[†]EAT-26 Score ≥ 20 indicates a high level of concern about dieting, body weight or problematic eating behaviors. [‡] Positive screening of behavioral questions indicates possible eating disorder symptoms or recent significant weight loss

 lpha regular exercise was defined as exercise more than 3 times a week, irregular exercise was defined as exercise less than 3 times a week

*p<0.05, ** p<0.001

research [18–20] that underscores the importance of screening for EDs in transfeminine youth, who exhibit higher rates than their cisgender counterparts, with formal diagnoses ranging from 2 to 18% and 42% reporting disordered eating behaviors in a large survey. These elevated rates are analyzed through the minority stress model, linking systemic discrimination with adverse mental health, and the tripartite influence model of body image and eating, highlighting the role of parents, peers, and media, especially in the context of increasing political tension, threats of violence, and the increasing influence of social media influence [9, 21, 22].

The 37.3% risk of ED contrasts with the lower incidence of incidence of 13% among Thai Transfeminine adults, highlighting age-related differences within the Thai transfeminine community [23]. These differences may stem from the challenges that youth face during puberty, a period characterized by significant physical changes. Transgender youth often become preoccupied with these changes, especially when they contradict their gender identity. Specifically, transfeminine youth might engage in weight restriction to counteract the development of masculine features during puberty or to conform to an idealized thin female aesthetic [9, 24].

Although the prevalence of ED in Asian countries, particularly Thailand, is comparatively lower than that observed in Western cultures, recent trends [25–27] indicate a rise in the number of adolescent cases and hospital admissions related to EDs. Consequently, there is a growing necessity for targeted screening in high-risk groups,



Fig. 1 Comparison of the EAT-26 (Part A: Eating Attitudes Test) scores between transfeminine and cisgender female groups EAT-26; Eating Attitudes Test-26, p-value was evaluated by Wilcoxon rank sum test

Table 3	Relationship	between	positive	EAT-26	screening	and
BICI score	2					

	Coefficient (95%Cl)*	<i>P</i> -value	R ²
EAT-26 Score≥20	-0.1 (-0.3 to 0.1)	0.313	0.007
Positive eating behavior screening	5.9 (3.3–8.5)	< 0.001*	0.031
EAT-26 Score≥20 and positive eating behavior screening	10.9 (7.8–14)	< 0.001*	0.070
EAT-26 Score≥20 or positive eating behavior screening	6.52 (3.89–9.16)	< 0.001*	0.030

BICI; Body Image Concern Inventory, EAT-26; Eating Attitudes Test-26 *Linear regression

with a special focus on transfeminine youth. This screening should comprehensively cover all subscale scores of the EAT-26, specifically addressing aspects such as dieting, bulimia, food preoccupation, and oral control, to ensure early detection and appropriate intervention.

Our study did not corroborate the strong correlation EAT-26 between and BICI scores in transfeminine groups, as suggested by prior research [21, 28]. This discrepancy may arise from the multifaceted factors contributing to both conditions. Consequently, further research, employing a robust design, is warranted to conclusively ascertain the nature of this correlation. However, this study indicates correlations when behavioral factors are considered, underscoring the importance of behavioral screening in these assessments.

This study highlights a substantially increased risk of disordered eating among obese individuals, who are 3.22 times more prone to these issues than their normalweight counterparts. This risk is often overlooked, especially given contemporary beauty and health standards. Obese transfeminine adolescents are particularly affected, as they may adopt harmful practices to control or reduce their weight, influenced by societal norms [29]. Additionally, individuals with low income face a 3.66 times higher risk compared to those in higher income brackets, likely due to limited knowledge, assessment opportunities, and healthcare access, further exacerbating the risk of ED symptomatology [30, 31]. Individuals engaging in infrequent physical exercise appear to exhibit a diminished susceptibility to EDs, potentially attributable to a reduced preoccupation with body weight. Concurrently, the data suggests that those who openly acknowledge their gender identity and demonstrate elevated levels of happiness are associated with a decreased risk of developing EDs. This correlation emphasizes the importance of psychological well-being and self-acceptance in mitigating the risk factors associated with EDs. However, the current study did not establish a significant association between the use of gender-affirming hormones and the risk of EDs. This finding suggests that the relationship between hormonal treatment in gender identity affirmation and ED susceptibility warrants further investigation to understand its complexities and implications.

Table 4 Risk Factors Associated with EAT-26 scores ≥ 20 in Transfeminine Individuals

	Univariate		Multivariate	
	OR (95% CI)	P-value	Adjusted	P-value
			OR (95% CI)	
Age group				
12–13 years old (early adolescent)	1.32 (0.25–7.10)	0.75		
14–17 years old (middle adolescent)	0.64 (0.27-1.47)	0.29		
18–21 years old (late adolescent	0.74 (0.39–1.37)	0.33		
22–25 years old (young adult)	1	Ref		
BMI by age				
Underweight	0.57 (0.30-1.08)	0.09	0.62 (0.31-1.24)	0.18
Normal	1	Ref	1	Ref
Overweight	1.92 (0.77–4.77)	0.16	2.12 (0.77-5.84)	0.15
Obese	2.84 (1.27-6.32)	0.01	3.22 (1.36–7.6)	0.008*
Frequency of Exercise				
Never	0.41 (0.17-1.02)	0.06	0.24 (0.09-0.66)	0.006*
Irregular ^a	0.50 (0.22-1.13)	0.10	0.37 (0.15-0.9)	0.03
Regular ^a	1	Ref	1	Ref
Gender affirming medicine or hormone				
No	1	Ref		
Yes	0.61 (0.27-1.35)	0.22		
Gender identity disclosure: yes	0.36 (0.14-0.93)	0.03	0.27 (0.1-0.77)	0.01*
Happiness score (0–10)	0.84 (0.74-0.97)	0.01	0.85 (0.73-0.98)	0.03*
Monthly household income				
<30,000 Baht (<860 USD)	3.31 (1.53–7.2)	0.002	3.66 (1.59-8.4)	0.002*
30,000–50,000 Baht (860–1450 USD)	2.15 (0.9-5.1)	0.08	2.01 (0.8-5.07)	0.14
>50,000 Baht (>1450 USD)	1	Ref	1	Ref

Univariate and multivariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate with p-value < 0.2 from univariate using linear regression, Multivariate were developed covariate using linear regression, Mul

BMI; body mass index, EAT-26; Eating Attitudes Test-26, OR; odd ratio, Ref; reference, USD; United States dollar

The limitation of this study is its cross-sectional design and reliance on self-reported online questionnaires without random sampling, which affects the generalizability of the findings. However, the strength of the study lies in its focus on transfeminine adolescents, a group with increased mental health risks but little research on EDs, especially in Asia. This addresses a significant gap in the literature, enhancing understanding of the unique challenges in this demographic. The potential for multicultural studies to further elucidate these issues is notable, considering the diversity of the transgender population globally.

Conclusion

There is a significantly higher prevalence of ED risk in transfeminine adolescents and young adults, compared to their cisgender female counterparts. Its associating factors include obesity and low household income, while protective factors are higher happiness score and gender identity disclosure. These findings emphasize the need for proactive screening and targeted intervention for the transgender adolescent population, as well as promoting health equity and access to health care.

Supplementary Information

The online version contains supplementary material available at https://doi.or g/10.1186/s40337-024-01135-4.

Supplementary Material 1	
Supplementary Material 2	
Supplementary Material 3	

Acknowledgements

The authors would like to extend our gratitude to the Tangerine clinic and the Buddy CU clinic for their assistance.

Author contributions

NA analyzed and interpreted the data, drafted and revised the manuscript. OS compiled the study questionnaire, interpreted the data and revised the manuscript. TP conducted participant enrollment and managed raw data. CB analyzed and interpreted data, drafted and finalized the manuscript. All authors reviewed and approved the final manuscript.

Funding

Our study received financial support from Ratchadapiseksompotch Fund, Faculty of Medicine, Chulalongkorn University, Grant No. GA65/03.

Data availability

The data that support the findings of this study are available on request from the corresponding author, CB.

Declarations

Ethics approval and consent to participate

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Ethics Committee of the faculty of Medicine, Chulalongkorn University. IRB number 613/64.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Pediatrics, Faculty of Medicine, Chulalongkorn University and King Chulalongkorn Memorial Hospital, Bangkok, Thailand ²Center of Excellence in Transgender Health (CETH), Chulalongkorn University, Bangkok, Thailand

Received: 18 June 2024 / Accepted: 23 October 2024 Published online: 14 November 2024

References

- Hornberger LL, Lane MA. Identification and Management of Eating Disorders in Children and Adolescents. Pediatrics. 2021;147(1).
- Rasmussen SM, Dalgaard MK, Roloff M, Pinholt M, Skrubbeltrang C, Clausen L, et al. Eating disorder symptomatology among transgender individuals: a systematic review and meta-analysis. J Eat disorders. 2023;11(1):84.
- Cella S, Iannaccone M, Cotrufo P. Influence of gender role orientation (masculinity versus femininity) on body satisfaction and eating attitudes in homosexuals, heterosexuals and transsexuals. Eat weight disorders: EWD. 2013;18(2):115–24.
- Lampis J, Cataudella S, Busonera A, De Simone S, Tommasi M. The moderating effect of gender role on the relationships between gender and attitudes about body and eating in a sample of Italian adolescents. Eat weight disorders: EWD. 2019;24(1):3–11.
- Burke NL, Hazzard VM, Schaefer LM, Simone M, O'Flynn JL, Rodgers RF. Socioeconomic status and eating disorder prevalence: at the intersections of gender identity, sexual orientation, and race/ethnicity. Psychol Med. 2023;53(9):4255–65.
- Nagata JM, Ganson KT, Austin SB. Emerging trends in eating disorders among sexual and gender minorities. Curr Opin Psychiatry. 2020;33(6):562–7.
- Vinitchagoon T, Wongpipit W, Phansuea P, Gender, Expression. Weight Status, and Risk of Experiencing Eating Disorders among Gender-Diverse Adults Assigned Male at Birth in Bangkok, Thailand. Nutrients. 2023;15(17).
- Testa RJ, Rider GN, Haug NA, Balsam KF. Gender confirming medical interventions and eating disorder symptoms among transgender individuals. Health psychology: official J Div Health Psychol Am Psychol Association. 2017;36(10):927–36.
- Campbell L, Viswanadhan K, Lois B, Dundas M. Emerging Evidence: A Systematic Literature Review of Disordered Eating Among Transgender and Nonbinary Youth. J Adolesc health: official publication Soc Adolesc Med. 2024;74(1):18–27.
- 10. Garner DM, Garfinkel PE. The Eating Attitudes Test: an index of the symptoms of anorexia nervosa. Psychol Med. 1979;9(2):273–9.
- 11. Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The eating attitudes test: psychometric features and clinical correlates. Psychol Med. 1982;12(4):871–8.
- 12. Littleton H, Breitkopf CR. The Body Image Concern Inventory: validation in a multiethnic sample and initial development of a Spanish language version. Body image. 2008;5(4):381–8.

- 13. Littleton HL, Axsom D, Pury CL. Development of the body image concern inventory. Behav Res Ther. 2005;43(2):229–41.
- Johns MM, Lowry R, Andrzejewski J, Barrios LC, Demissie Z, McManus T, et al. Transgender Identity and Experiences of Violence Victimization, Substance Use, Suicide Risk, and Sexual Risk Behaviors Among High School Students – 19 States and Large Urban School Districts, 2017. MMWR Morbidity Mortal Wkly Rep. 2019;68(3):67–71.
- 15. New Thai Growth Chart by TSPE [Internet]. Thai Society for Pediatric Endocrinology. 2022. https://thaipedendo.org/thai-growth-chart-by-tspe/
- The Royal College of Peditricians of Thailand. Clinical Practice Guideline for Obesity in Children and Adolescents in Thailand, 2014 [cited 2023 28 Aug]. https://www.thaipediatrics.org/?p=700
- Kaewporndawan T, Pariwatcharakul P, Pimratana W. Criterion Validity Study of the Eating Attitudes Test-26 (EAT-26 Thai Version) Among Thai Females. J Psychiatric Association Thail. 2013;58:283–96.
- Coelho JS, Suen J, Clark BA, Marshall SK, Geller J, Lam PY. Eating Disorder Diagnoses and Symptom Presentation in Transgender Youth: a Scoping Review. Curr psychiatry Rep. 2019;21(11):107.
- Diemer EW, Grant JD, Munn-Chernoff MA, Patterson DA, Duncan AE. Gender Identity, Sexual Orientation, and Eating-Related Pathology in a National Sample of College Students. J Adolesc health: official publication Soc Adolesc Med. 2015;57(2):144–9.
- Watson RJ, Veale JF, Saewyc EM. Disordered eating behaviors among transgender youth: Probability profiles from risk and protective factors. Int J Eat Disord. 2017;50(5):515–22.
- Romito M, Salk RH, Roberts SR, Thoma BC, Levine MD, Choukas-Bradley S. Exploring transgender adolescents' body image concerns and disordered eating: Semi-structured interviews with nine gender minority youth. Body image. 2021;37:50–62.
- 22. Parker LL, Harriger JA. Eating disorders and disordered eating behaviors in the LGBT population: a review of the literature. J Eat disorders. 2020;8:51.
- 23. Vinitchagoon T, Wongpipit W. Gender Expression, Weight Status, and Risk of Experiencing Eating Disorders among Gender-Diverse Adults Assigned Male at Birth in Bangkok. Thailand. 2023;15(17).
- Aungkawattanapong N, Prownpuntu T, Bongsebandhu-phubhakdi C. Exploring Transfeminine Youth Health Disparities in Thailand: An Online Survey Analysis of Characteristics and Hormonal Use Patterns. Health Equity. 2024;8(1):676–82.
- Areemit RS, Patjanasoontorn N. Anorexia nervosa in a Thai adolescent. Eat weight disorders: EWD. 2012;17(3):e207–9.
- Manaboriboon B, In et al. -Iw S, Bongsebandhu-Phubhakdi C, Arunakul J, Kamol N, Areekul W, Feeding and eating disorders among hospitalized children and adolescents in Thailand: A 5-year secondary national database analysis. 2023:e13189.
- 27. Jennings PS, Forbes D, McDermott B, Hulse G, Juniper S. Eating disorder attitudes and psychopathology in Caucasian Australian, Asian Australian and Thai university students. Aust N Z J Psychiatry. 2006;40(2):143–9.
- McClain Z, Peebles R. Body Image and Eating Disorders Among Lesbian, Gay, Bisexual, and Transgender Youth. Pediatr Clin North Am. 2016;63(6):1079–90.
- Rukavishnikov GV, Verbitskaya EV, Vekovischeva OY, Bobrovsky AV, Kibitov AO, Mazo GE. The association of obesity with eating disorders risk: online survey of a large cohort of Russian-speaking individuals seeking medical weight correction assistance. J Eat disorders. 2021;9(1):100.
- Power Y, Power L, Canadas MB. Low socioeconomic status predicts abnormal eating attitudes in Latin American female adolescents. Eat Disord. 2008;16(2):136–45.
- Lee HJ, Park S, Kim Cl, Choi DW, Lee JS, Oh SM, et al. The association between disturbed eating behavior and socioeconomic status: the Online Korean Adolescent Panel Survey (OnKAPS). PLoS ONE. 2013;8(3):e57880.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.