ORIGINAL ARTICLE

Gender differences in weight bias internalization and its association with quality of life among overweight and obese high school students in Upper North Thailand.

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ABSTRACT

Adolescents who are overweight and obese often experience the impact of weight bias internalization (WBI) on their quality of life (QoL). However, there is limited research on how WBI and its effects on QoL vary by gender in Thailand. This study aims to describe gender differences in WBI and its association with QoL among overweight and obese high school students. A cross-sectional study was conducted on 1,012 overweight and obese students from the upper northern region of Thailand, selected through a multi-stage random sampling process. Data were collected using a self-administered questionnaire, and hierarchical linear regression was applied to assess the relationship between WBI and QoL. The results revealed that 52.6% of the participants were girls, with a mean BMI of 25.7 kg/m_2 (SD = 1.6). Girls reported greater WBI and body image dissatisfaction (BD) than boys ($P = 0.014$, $P = 0.024$, respectively), while boys reported significantly higher overall QoL scores and across all domains (physical health, psychological health, social relationships, and environment) compared to girls ($P< 0.001$). The association between WBI and QoL varied by gender, particularly in the psychological health domain ($\beta = -0.573$, $P < 0.001$ for girls; $\beta = -0.403$, $P=0.105$ for boys), but no significant gender differences were observed in other QoL domains. In conclusion, WBI and its effects on the psychological health aspects of QoL differed by gender among overweight and obese high school students. Therefore, intervention strategies aimed at reducing WBI should consider gender-specific approaches to improve QoL.

Keywords:
Body image, Obesity, Overweight, Quality of Life, Weight Stigma

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INTRODUCTION

Adolescents with higher body weights are particularly vulnerable to societal biases and weight bias internalization (WBI).[1] WBI occurs when individuals believe and accept negative weight-related stigma and stereotypes.[2] For adolescents, these experiences often manifest as weight-based teasing, bullying, and victimization from peers and family members.[3,4] WBI has consistently been associated with overweight or obesity and adverse health outcomes, including diminished physical and psychological health, as well as a lower quality of life (QoL).[1] Some studies have shown that weight-related stigmatization, teasing, or bullying can negatively affect both psychological and physical well-being, leading to social isolation and impaired QoL in individuals who are overweight or obese.[3–5] Moreover, recent studies indicate that adolescents with overweight or obesity, especially those who experience WBI, report poor QoL across psychological, physical, social, and environmental domains.[5–7] Thus, WBI poses an important challenge to the well-being of adolescents with overweight and obesity, as it may negatively impact their QoL.[8]

Although both boys and girls with overweight or obesity are susceptible to WBI, evidence regarding gender differences is mixed. Some studies have reported no significant difference in WBI between boys and girls,[9,10] while others have found that girls experience higher levels of WBI than boys.[11,12] Additionally, the impact of adolescent obesity on QoL may be influenced by cultural norms and societal expectations, which can differ between boys and girls.[3,8] However, due to the limited number of studies examining these gender differences, the findings remain inconclusive.[3,5]

In Thailand, previous studies have shown that approximately 30.8% of high school students were bullied due to their weight, 37.8% of adolescents with overweight or obesity exhibited higher levels of WBI, and 42.7% of those with elevated WBI reported poor QoL.[5,13] These findings suggest that Thai adolescents may experience WBI, which negatively impacts their QoL. Additionally, sociocultural beauty standards in Thailand, which emphasize muscularity in boys and thinness in girls, have become significant ideals among high school students.[14] Studies indicate that high school students—both boys and girls—who perceive themselves as overweight are dissatisfied with their weight and desire to lose weight. They often engage in weight loss practices, including excessive exercise, restrictive eating, calorie reduction, dieting, and the use of diet pills. However, these unhealthy weight loss behaviors may lead to nutritional deficiencies and negatively affect psychosocial health, thereby reducing QoL.[14,15]

Despite the recognition of WBI's negative impact on QoL among overweight or obese high school students, limited research exists on WBI in Thailand, particularly concerning gender differences in the association between WBI and QoL impairment.[5,13] To address this research gap, this study aims to examine gender differences in WBI and its association with various domains of QoL. Insights gained from this study will inform the design of school-based interventions to reduce WBI and improve QoL among students who are overweight or obese.

METHODS

Study design and settings

This cross-sectional study was conducted from January 2022 to December 2023 in high schools in the upper northern region of Thailand.

Study participants

The included participants were high school students aged 15–18 years classified

as overweight or obese based on body mass index (BMI)-for-age according to WHO cut-offs,[16] without any reported communication or mental health problems and who were willing to participate in the study. Individuals who provided incomplete responses were excluded from the study. The sample size was calculated using Cochran's formula,[17] with an estimated 30.8% of high school students experiencing weight stigma, as reported by Thumronglaohapun et al.[13]. With a 95% confidence interval and a precision of 3%, the minimum sample size required was 910 students, with an additional 10% added to account for potential nonresponses, resulting in a final sample size of 1,012 students. Of the 1,124 students enrolled, 97 were excluded due to incomplete responses, and 15 declined to participate.

A multistage sampling method was employed to select the 1,012 students who met the eligibility criteria. First, 40 high schools were randomly selected from the 8 provinces in the upper northern region using a lottery method, proportional to the number of schools in each province. Second, six classrooms were randomly chosen from each selected school. Finally, students were selected using systematic random sampling, where every sixth student identified as overweight or obese was invited to participate. If a selected student was absent or unwilling to participate, the next student on the list was contacted for participation.

Instruments

This self-administered questionnaire consisted of three sections as outlined below, with socio-demographic factors and WBI as predictors, and QoL as the outcome variable.

Part 1: Socio-demographic factors

This section included gender, age, and body image satisfaction, with all variables categorized as dichotomous. Body image satisfaction was assessed through the question, "Are you satisfied with your figure?"[18] This variable was categorized as either "Yes" (satisfied) or "No" (dissatisfied). Portable height and weight meters were used to measure the students' height and weight. BMI was calculated as weight (kg)/height (m^2), and the standard deviation (SD) score (BMI Z-score) was determined using the WHO reference (2007) for BMI-for-age and sex-specific guidelines for children aged 5–19 years.[16] BMI-for-age was then classified as either overweight (BMI Z-score of >1 SD to ≤ 2 SD) or obese (BMI Z-score of > 2 SD).

Part 2: Weight bias internalization ь (WBI)

WBI was measured using the Modified Weight Bias Internalization Scale (WBIS-M)[19] to assess the extent to which students internalize negative weight-based stereotypes and blame themselves for weight-related stigma. This 10-item scale is rated on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores were computed by averaging all items, with higher scores indicating greater WBI. Based on recommendations by Puhl et al.,[20] WBI was categorized into three groups using the study's mean and SD as cutoffs. The mean and SD in this study were 3.35 ± 0.90. Accordingly, low WBI (1 SD below the mean) corresponded to scores ≤ 2.45, moderate WBI to scores between 2.46 to 4.24, and high WBI (1 SD above the mean) corresponded to scores ≥ 4.25. The scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.84.

Part 3: Quality of life (QoL)

The Thai version of the WHOQOL-BREF (WHOQOL-BREF-THAI) was used to assess QoL. This questionnaire consists of 26 standard items,[21] including two global

items: one for overall QoL and one for general satisfaction with health. The remaining 24 items are divided into four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environment (8 items). Self-administered responses were rated on a 5-point scale ranging from 1 (never) to 5 (always). The mean score for each domain was calculated and transformed into a 0–100 scale, with higher scores indicating better QoL. The internal consistency of the total QoL scale was good, with a Cronbach's alpha of 0.88.

Statistical analysis

Descriptive statistics were employed to analyze the characteristics of all variables. Chi-square tests were performed for categorical variables, while independent-sample *t*-tests were used to assess gender differences in continuous variables. Point-biserial correlations were used for body dissatisfaction (BD), polyserial correlations for WBI, and Pearson's correlations for all other continuous variables to examine associations between the selected variables for girls and boys. Next, hierarchical linear regression analyses were carried out to assess the association between WBI and QoL in gender-specific models, adjusting for all other predictors. In Model 1, age, BD, and BMI were included. In Model 2 (the final model), WBI was added to the predictors from Model 1. All statistical analyses were performed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA), and a *P*-value of < 0.05 was considered statistically significant.

Ethical Approval

This study was approved by the Ethics Committee for Research Involving Human Subjects at Mahasarakham University (ref. no. 337-280/2564). Written informed consent was obtained from the parents of all participants after providing detailed research information. Students completed a self-administered questionnaire for data collection.

RESULTS

Table 1. Distribution of socio-demographic factors, WBI factor and QOL by gender

Variables	Total (n=1012)		Girls (n=532)		Boys (n=480)		*P*-value
Socio-demographic factors							
Age (y), mean (S.D.)	16.8	(0.8)	16.7	(0.8)	16.8	(0.9)	0.697‡
BMI (kg/m^2), mean (S.D.)	25.7	(1.6)	25.6	(1.6)	25.7	(1.7)	0.748‡
BMI Z-score category (kg/m^2), n (%)							0.770¶
Overweight	538	(53.2)	280	(52.6)	258	(53.8)	
Obese	474	(46.8)	252	(47.4)	222	(46.2)	
Body image satisfaction, n (%)							
Dissatisfied	490	(48.4)	276	(51.9)	214	(44.6)	0.024¶
Satisfied	522	(51.6)	256	(48.1)	266	(55.4)	
WBI, n (%)							
Low	263	(26.0)	122	(22.9)	141	(29.4)	0.014¶
Moderate	369	(36.5)	190	(35.7)	179	(37.3)	
High	380	(37.5)	220	(41.4)	160	(33.3)	
QOL factors , mean (S.D.)							
Overall QOL	72.8	(9.1)	71.9	(9.3)	73.9	(8.7)	<0.001‡
Physical health	70.9	(9.5)	69.5	(9.1)	72.7	(9.7)	<0.001‡
Psychological health	69.9	(9.2)	68.2	(8.8)	71.8	(9.2)	<0.001‡
Social relationships	71.7	(9.6)	70.1	(9.2)	73.4	(9.8)	<0.001‡
Environment	72.5	(9.3)	72.2	(9.1)	72.9	(9.6)	<0.001‡

Note: WBI, weight bias internalization; QOL, quality of life; S.D., Standard deviation;
¶ Chi-square test; ‡ Independent sample t-test

Sample characteristics

Most respondents (52.6%) were girls, with a mean age of 16.8 years (SD = 0.8) and a mean BMI of 25.7 kg/m^2 (SD = 1.6). Of these participants, over half (53.2%) were classified as overweight based on BMI Z-score. No significant gender differences were found in terms of age, BMI, or BMI Z-scores. However, body image satisfaction differed significantly between girls and boys, with a higher proportion of girls reporting dissatisfaction with their body image compared to boys (51.9% vs. 44.6%, $P = 0.024$; Table 1).

WBI and QoL difference between boys and girls

Approximately 37.5% of respondents reported high levels of WBI, with a significant gender difference (41.4% in girls vs. 33.3% in boys, $P = 0.014$). Across the entire sample, the highest average QoL scores were observed in the environment domain, while the lowest scores were in the psychological health domain. Furthermore, boys had significantly higher overall QoL scores, as well as higher scores across all four QoL domains (physical health, psychological health, social relationships, and environment), compared to girls ($P < 0.001$; Table 1).

Table 2: Correlation between selected variables for each gender (girls below diagonal and boys above diagonal).

Variables	1	2	3	4	5	6	7	8	9
1. Age	**1**	0.104*	-0.024	0.113*	-0.101*	-0.108*	-0.107*	-0.106*	-0.105*
2. BMI	0.106*	**1**	0.177**	0.439**	-0.492**	-0.518**	-0.503**	-0.547**	-0.535**
3. BD	-0.053	0.119**	**1**	0.140**	-0.262**	-0.253**	-0.239**	-0.266**	-0.263**
4. WBI	0.103*	0.321**	0.126**	**1**	-0.656**	-0.575**	-0.554**	-0.602**	-0.601**
5. Overall QOL	-0.115*	-0.451**	-0.206**	-0.721**	**1**	0.777***	0.778**	0.839**	0.798**
6. Physical health	-0.112*	-0.420**	-0.180**	-0.716**	0.824**	**1**	0.783**	0.906**	0.955**
7. Psychological health	-0.109*	-0.427**	-0.219**	-0.663**	0.793**	0.921**	**1**	0.860**	0.803**
8. Social relationships	-0.101*	-0.431**	-0.235**	-0.711**	0.808**	0.916**	0.888**	**1**	0.919**
9. Environment	-0.106*	-0.390**	-0.183**	-0.653**	0.716**	0.831**	0.789**	0.907**	**1**

Note: WBI, weight bias internalization; QOL, quality of life; BMI, Body mass index; BD, Body image dissatisfaction; *P < 0.05; **P < 0.01; WBI (1=low,2=moderate,3=high); BD (0= satisfied, 1= dissatisfied)

Bivariate correlations

In both genders, older age, greater levels of WBI and BD, and higher BMI were significantly negatively correlated with overall QoL and all domains ($P < 0.01$; Table 2).

Table 3. Hierarchical multiple linear regression with overall QOL between girls and boys

Variables	Girls								Boys							
	Model 1				Model 2				Model 1				Model 2			
	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*
Age	-0.539	0.407	-0.051	0.186	-0.349	0.300	-0.033	0.246	-0.151	0.382	-0.016	0.692	-0.176	0.316	-0.018	0.579
BMI	-2.552	0.229	-0.430	<0.001	-1.395	0.177	-0.235	<0.001	-2.426	0.210	-0.459	<0.001	-1.221	0.192	-0.231	<0.001
BD	-2.938	0.718	-0.158	<0.001	-1.868	0.531	-0.100	<0.001	-3.175	0.697	-0.181	<0.001	-2.571	0.578	-0.147	<0.001
WBI	-	-	-	-	-7.528	0.356	-0.631	<0.001	-	-	-	-	-5.966	0.403	-0.534	0.001

Girls: Model 1, R^2 Change=0.229, F =52.334, *P* <0.001; Model 2, R^2 Change=0.354, F = 48.014, *P* <0.001
Boys: Model 1, R^2 Change=0.274, F =59.877, *P* <0.001; Model 2, R^2 Change=0.229, F =92.068, *P* <0.001
Note: WBI, weight bias internalization; QOL, quality of life; BMI, Body mass index; BD, Body image dissatisfaction; B, unstandardized coefficients; SE, standard error; β, standardized coefficients; *P*, *P*-value

Table 4. Hierarchical linear regression with all four QOL domains in girls (n=532)

Variables	Model 1															
	Physical health				Psychological health				Social relationships				Environment			
	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*
Age	-1.167	0.369	-0.123	0.264	-043	0.393	-0.044	0.260	-1.152	0.367	-0.120	0.301	-0.319	0.413	-0.031	0.441
BMI	-2.297	0.228	-0.393	<0.001	-2.297	0.220	-0.405	<0.001	-2.348	0.227	-0.398	<0.001	-2.164	0.232	-0.372	0.011
BD	-2.581	0.716	-0.141	<0.001	-3.073	0.692	-0.173	<0.001	-3.607	0.712	-0.195	<0.001	-2.552	0.728	-0.140	0.027
	R^2 Change $_{\text{physical health}}$ 0.209, F=46.433, *P*<0.001				R^2 Change $_{\text{psychological health}}$ 0.213, F=47.696, *P*<0.001				R^2 Change $_{\text{social relationships}}$ 0.234, F=53.781, *P*<0.001				R^2 Change $_{\text{Environment}}$ 0.172, F=36.563, *P*<0.001			

Variables	Model 2 (final)															
	Physical health				Psychological health				Social relationships				Environment			
	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*	B	SE	β	*P*
Age	-0.766	0.275	-0.081	0.356	-0.278	0.312	-0.027	0.373	-0.756	0.275	-0.079	0.187	-0.147	0.331	-0.014	0.656
BMI	-1.171	0.178	-0.201	<0.001	-1.293	0.184	-0.228	<0.001	-1.237	0.178	-0.201	<0.001	-1.125	0.195	-0.194	0.112
BD	-1.488	0.534	-0.081	0.006	-2.145	0.552	-0.121	<0.001	-2.528	0.534	-0.136	<0.001	-1.591	0.586	-0.087	0.097
WBI	-7.437	0.358	-0.634	<0.001	-6.526	0.370	-0.573	<0.001	-7.343	0.356	-0.619	<0.001	-6.759	0.393	-0.579	0.098
	R^2 Change $_{\text{physical health}}$ 0.356, F=83.583, *P*<0.001				R^2 Change $_{\text{psychological health}}$ 0.292, F=81.243, *P*<0.001				R^2 Change $_{\text{social relationships}}$ 0.339, F=99.411, *P*<0.001				R^2 Change $_{\text{Environment}}$ 0.298, F=76.228, *P*=0.101			

Note: WBI, weight bias internalization; QOL, quality of life; BMI, Body mass index; BD, Body image dissatisfaction; B, unstandardized coefficients; SE, standard error; β, standardized coefficients; *P*, *P*-value

Table 5. Hierarchical linear regression with all four QOL domains in boys (n=480)

Variables	Model 1															
	Physical health				Psychological health				Social relationships				Environment			
	B	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***
Age	-0.336	0.417	-0.031	0.420	-0.307	0.400	-0.030	0.443	-0.480	0.413	-0.044	0.246	-0.377	0.405	-0.035	0.352
BMI	-2.856	0.229	-0.487	<0.001	-2.628	0.220	-0.474	0.022	-3.053	0.227	-0.514	<0.001	-2.909	0.223	-0.503	0.015
BD	-3.254	0.761	-0.167	<0.001	-2.870	0.729	-0.156	0.034	-3.467	0.753	-0.176	<0.001	-3.359	0.740	-0.175	0.037
	R^2 Change $_{\text{physical health}}$ 0.296, F=66.824, *P*<0.001				R^2 Change $_{\text{psychological health}}$ 0.277, F=60.862, *P*<0.001				R^2 Change $_{\text{social relationships}}$ 0.330, F=78.184, *P*<0.001				R^2 Change $_{\text{Environment}}$ 0.317, F=73.670, *P*<0.001			
Variables	**Model 2 (final)**															
	Physical health				**Psychological health**				**Social relationships**				**Environment**			
	B	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***	**B**	**SE**	**β**	***P***
Age	-0.357	0.373	-0.033	0.339	-0.326	0.362	-0.032	0.369	-0.502	0.363	-0.046	0.167	-0.399	0.356	-0.037	0.263
BMI	-1.806	0.227	-0.308	<0.001	-1.674	0.220	-0.302	0.127	-1.942	0.220	-0.327	<0.001	-1.815	0.216	-0.314	0.231
BD	-2.727	0.683	-0.140	<0.001	-2.392	0.663	-0.130	0.166	-2.909	0.663	-0.147	<0.001	-2.811	0.652	-0.146	0.246
WBI	-5.198	0.476	-0.419	<0.001	-4.723	0.462	-0.403	0.105	-5.502	0.462	-0.438	<0.001	-5.415	0.454	-0.442	0.110
	R^2 Change $_{\text{physical health}}$ 0.141, F=99.321, *P*<0.001				R^2 Change $_{\text{psychological health}}$ 0.130, F=94.583, *P*=0.110				R^2 Change $_{\text{social relationships}}$ 0.154, F=91.586, *P*<0.001				R^2 Change $_{\text{Environment}}$ 0.157, F=92.176, *P*=0.114			

Note: WBI, weight bias internalization; QOL, quality of life; BMI, Body mass index; BD, Body image dissatisfaction; B, unstandardized coefficients; SE, standard error; β, standardized coefficients; *P*, *P*-value

Associations of WBI with QoL

In the hierarchical linear regression analysis for overall QoL, Model 1 showed that higher BMI and BD were independently and negatively associated with overall QoL in both genders (P< 0.001). In Model 2, after adding WBI, greater WBI was strongly negatively associated with overall QoL in both genders (β = -0.631, P < 0.001 for girls; β = -0.534, P = 0.001 for boys), after controlling for socio-demographic factors (Table 3). In addition, we examined the four domains of QoL. In Model 2, after adjusting for all predictors, greater WBI in girls was significantly associated with poorer psychological health, a pattern not observed in boys (β = -0.573, P < 0.001 for girls; β = -0.403, P = 0.105 for boys). Furthermore, WBI was negatively associated with physical health (β = -0.634, P < 0.001 for girls; β = -0.419, P < 0.001 for boys) and social relationships (β = -0.619, P < 0.001 for girls; β = -0.438, P < 0.001 for boys) in both genders. However, there was no significant association between WBI and the environment domain scores in either gender (β = -0.579, P = 0.098 for girls; β = -0.442, P = 0.110 for boys; Tables 4 and 5).

DISCUSSION

This study revealed significant gender differences in WBI and BD among overweight and obese adolescents. Girls reported higher WBI than boys, consistent with prior studies, which have shown that adolescents with overweight or obesity experience weight-related stigma and are more prone to WBI, with girls being more affected.[4,22,23] One explanation for this is the internalization of societal thin ideals, where girls perceive a thinner body type as more attractive than boys.[23,24] Girls' idealization of and desire for a “thinner” body may exacerbate their internalization of negative attitudes towards body weight, making them more vulnerable to WBI.[22,24] Furthermore, in Thai society, thinness is often regarded as more attractive for girls, placing societal pressure on them to conform to this beauty standard.[25] This pressure may drive an increased desire among girls to meet these expectations, leading to greater BD and concern about weight and appearance compared to boys,[3,24] which in turn exposes them to more weight-based teasing and WBI.[23,24]

Concerning BD, girls also reported higher levels of dissatisfaction with their bodies compared to boys. This finding is consistent with previous research, which suggests that girls with overweight or obesity are generally more dissatisfied with their body weight and appearance than boys.[26,27] During adolescence, body image undergoes significant changes due to puberty, including weight gain, changes in body shape, and increased body fat in girls, while boys typically experience an increase in muscular mass.[28,29] These physical changes interact with societal body ideals and individual psychological adjustment, often contributing to dissatisfaction with appearance.[24,29] For girls, pubertal changes such as weight gain and broader hips may negatively impact self-image in societies where slenderness is idealized.[26,28] As a result, girls may develop a negative body image when their changing bodies do not align with societal ideals.[29] The internalization of these thin ideals places pressure on girls to be more concerned about their weight and body shape, driving a stronger desire to lose weight and maintain a socially acceptable body size.[28,29] This likely explains why girls experience greater BD than boys during adolescence.

Interestingly, we found that greater WBI was associated with poorer overall QoL in both boys and girls. This finding is consistent with previous studies, which have shown that overweight and obese adolescents with higher WBI report lower QoL.[30,31] One explanation for this result is that WBI has been linked to a range of adverse physical (e.g., increased cortisol

levels and weight gain), psychological (e.g., depression, perceived stress, low self-esteem, and BD), social (e.g., poor socialization and social isolation), and behavioral health outcomes (e.g., disordered eating, binge eating, and reduced physical activity).[1,3,8] These adverse impacts of WBI may undermine both physical and mental health, ultimately diminishing overall QoL.[4,6,7]

Regarding the psychological health domain, our findings showed that greater WBI was negatively associated with impaired psychological functioning in girls but not in boys. This result aligns with previous research, which indicates that girls with higher weight are more susceptible to WBI and experience worse psychological functioning compared to boys.[32–34] It is possible that the onset of menarche and pubertal development may influence girls' psychological well-being.[3,28] During puberty, girls often face greater challenges with social transitions (e.g., peer relationships, peer rejection, and bullying) and emotional adjustment (e.g., depression, low self-esteem, and negative body image) compared to boys.[3,4] These challenges may contribute to poorer psychological health and exacerbate the negative effects of WBI on psychological QoL in girls.[32,33] Moreover, overweight or obese girls with higher WBI are more likely to experience weight-related stigmatization, teasing, and bullying, which can lead to psychological distress, including BD, stress, and depression.[3,4] When girls perceive their appearance as falling short of societal ideals, this may further exacerbate their psychological distress, resulting in poorer QoL in the psychological health domain.[28,29]

Furthermore, no significant gender differences were found in the physical health and social relationships domains. Previous research has similarly reported that overweight or obese individuals with higher WBI experience lower QoL in these domains, regardless of gender.[30,32] In the physical health domain, one explanation is that individuals who are overweight or obese often face weight bias and discrimination, which can exacerbate BD and increase stress levels.[3,26] This stress, linked to WBI, may negatively impact physical health by contributing to metabolic abnormalities, unhealthy eating behaviors, dieting, avoidance of physical activities, dysfunctional exercise habits, and unhealthy coping mechanisms such as smoking and binge drinking.[28,30] These behaviors may ultimately impair physical well-being and contribute to poorer QoL.[30] Regarding the social relationships domain, the physical changes associated with puberty likely play a role in exposing individuals to sociocultural beauty standards,[3,28] which emphasize muscularity in boys and thinness in girls.[29] Individuals who are overweight or obese and experience higher WBI may encounter societal stigma toward their weight and body image, which often deviate from these societal ideals. Such biased attitudes may manifest as negative stereotypes, social rejection, and weight-related teasing,[28,29] leading to social isolation or diminished social interactions, thereby affecting social functioning and contributing to lower QoL.[3,32]

This study had several limitations. First, the sample was limited to overweight and obese students from public high schools in the upper northern region of Thailand, which may restrict the generalizability of the results to the broader national population. Second, we cannot establish causal relationships due to the cross-sectional design of the study. Longitudinal research is needed to better understand the causal relationships between WBI and QoL. Third, WBI was assessed using the WBIS-M, which may produce results that differ from those obtained using

other scales. However, the WBIS-M has been widely used in community-based samples and is a reliable measure of WBI. Fourth, this study focused on binary gender (boys and girls) within a sample of adolescents with higher weights, while research suggests that gender-diverse adolescents are also vulnerable to weight-based victimization and WBI.[4] Thus, further studies should include adolescents of diverse gender identities. Despite these limitations, our study offers valuable insights into WBI, which is generally experienced by adolescents with overweight or obesity, and its influence on various aspects of QoL, with notable gender differences. The findings highlight the importance of developing individual- or school-based interventions aimed at reducing or preventing WBI to improve QoL.

CONCLUSION

This study revealed significant gender differences in WBI, BD, and the associations between higher WBI and poorer psychological health-related aspects of QoL among overweight and obese students. Our findings highlight the important role that WBI plays in psychological well-being, particularly in girls. Therefore, interventions aimed at reducing WBI should be tailored to address gender-specific concerns to effectively improve QoL.

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CONFLICTS OF INTERESTS

There are no conflicts of interest.

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